MUSKEGON BOILER WORKS

DESIGNERS
EST. 1865
BUILDERS

BUILDERS OF
BOILERS · STACKS · PRESSURE VESSELS
TANKS · FABRICATED PLATE *and* PIPE WORK

MUSKEGON // MICHIGAN

DESIGNERS
BUILDERS

A Lifetime of Progress

A LIFETIME ago—in 1865—the Muskegon Boiler Works began the fabrication of boilers and plate work. These are its principal products today.

In the early days, the customers were the great lumber mills of Michigan. Speed—more speed—was their production motto. No breakdowns or interruptions in power supply could be tolerated in the face of a constant increase in the demand for lumber. With the rapid improvement in their methods of manufacture, they could accept no equipment which failed to anticipate, in design and operation, their changing needs.

In this atmosphere of constant change and improvement of design, the Muskegon Boiler Works adhered rigidly to the highest standards in materials and workmanship. So well did it build that when the lumber industry left Michigan, the Company's reputation travelled far into other sections. Its territory and sphere of service expanded until, today, the products of the Muskegon Boiler Works are serving a wide range of important industrial and utility plants from coast to coast, and in foreign lands.

To visualize the variety, character, and application of the service and products of the Muskegon Boiler Works, this book is presented.

MUSKEGON BOILER WORKS
MUSKEGON, MICH.

AN EFFICIENT ORGANIZATION

THE ever increasing range for the products of the Muskegon Boiler Works has developed an organization of trained executives and engineers. They are supported by efficient superintendents, foremen, skilled workmen and erectors. You are assured a master's attention to work in the shop and field. Cooperation between departments applies this knowledge and proficiency to the work of each customer.

A MODERN PLANT

In 1893 the Muskegon Boiler Works purchased the most modern machine of its kind shown at the World's Fair in Chicago. This policy of always keeping its equipment to the forefront of the industry, has been religiously followed. The machines in the shop have had individual motor drives for years. The equipment is complete and capable of properly handling in the shop and field, the wide range of products which you will find in the pages to follow.

COMPLETE STOCKS

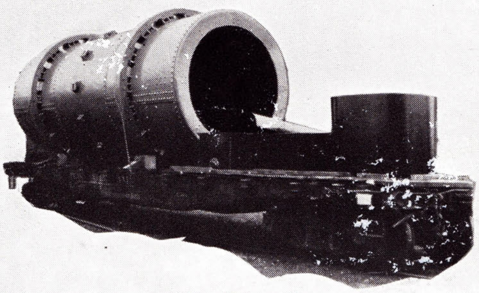
Large stocks of sheets, plates, structural shapes and other materials entering into the products of the Company are maintained at all times. Connections with the steel mills for maintenance of stocks are excellent. The largest warehouses in the country are but 10 hours distant and available for special material.

QUICK SHIPMENT

Shipping facilities are admirable for rail, water and truck transportation. Cars are loaded direct. Moving over any one of three trunk lines, shipments are placed in the important Middle Western industrial centers in from 16 to 36 hours.

HELPFULNESS

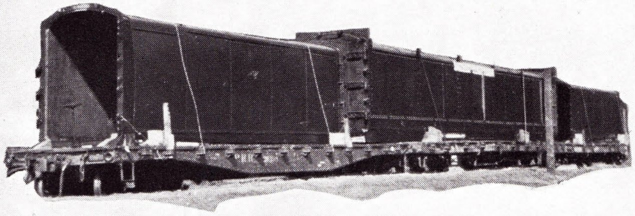
It has always been the policy of the Muskegon Boiler Works to place all of its experience and skill at the disposal of its customers to help solve their problems.



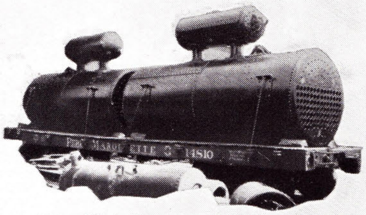
106 *Rotary Furnace.*

FROM
MUSKEGON BOILER WORKS
GRAND TRUNK

105 *Municipal Intake Pipe.*

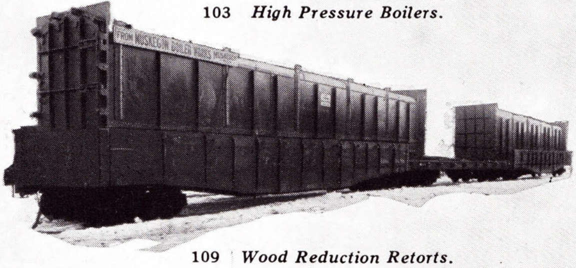


1010 *Charcoal Retort and Coolers.*

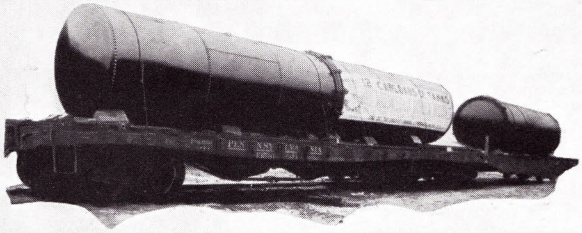

PERE MARQUETTE

103 *High Pressure Boilers.*

107 *Special Burner Base.*


FROM MUSKEGON BOILER WORKS

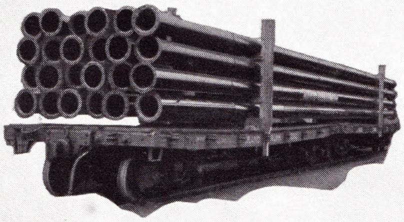
109 *Wood Reduction Retorts.*



104 *Special Process Vacuum Drums.*

FROM
MUSKEGON BOILER WORKS

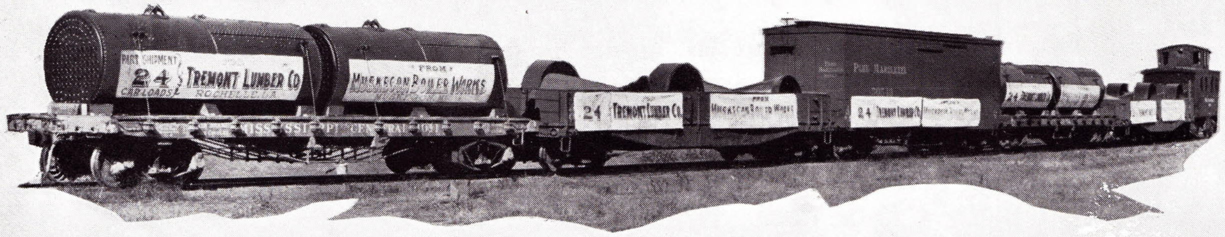
102 *Storage Tank.*



108 *Industrial Intake Pipe.*

NO 80 OF 90 CAR LOADS BOILERS
MUSKEGON BOILER WORKS

101 *Power Boilers.*


PART SHIPMENT
24 CARLOADS
TREMONT LUMBER CO
FROM
MUSKEGON BOILER WORKS
PERE MARQUETTE

1011 *Boilers and Parts for Battery Settings.*

The above illustrations are of typical shipments and show the completen
of facilities for handling and loading large and heavy constructi

THE HORIZONTAL RETURN TUBULAR BOILER

THE Evans return flue boiler, built about 1800, was the forerunner of today's return tubular boiler. Since its development, other types have appeared which have been more widely advertised. Notwithstanding the fact that the tubular boiler has not had the benefit of such publicity, it has held its own as a dependable steam generator.

The return tubular boiler, when properly set, is with a fraction of the attention needed by other types, economical and efficient and one that will always have its place in power plants.

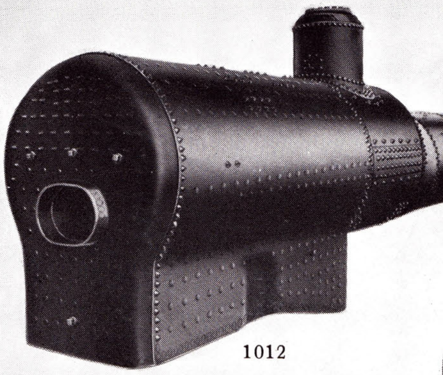
THE MUSKEGON STEEL CASING

The boilers on steam packets, which years ago were a common sight on our rivers, were of the return flue type and of necessity employed steel casings to hold the brick work of the settings in place. One of the early sawmill operators in the South insisted that the boilers in his steam plant be set with a steel casing the same as used on the river boats. This soon became the practice in the sawmill boiler room and the type was known as the steamboat setting.

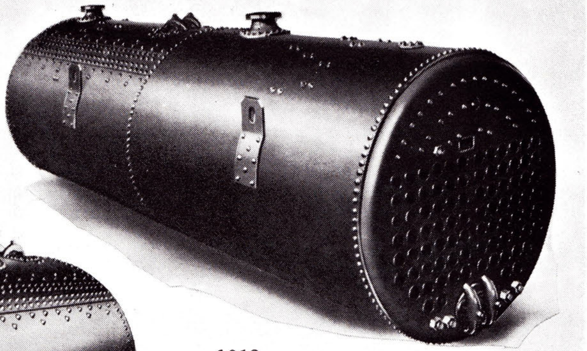
In this type of setting, the casing in the rear of the furnace was barrel shape and placed very close to the boiler shell, materially restricting the gas passage in rear of the bridge wall. This feature, not objectionable in sawmills where there was an excess of refuse fuel, limited the steamboat setting of such plants.

To make this setting efficient, the Muskegon Boiler Works designed and installed the first Muskegon Steel Casings in 1908 for a battery of sixteen boilers. The Muskegon Casing differed from the steamboat type in that the throat (that part in rear of the bridge wall) was made flat and placed much below the bottom of the boiler, while the floor of the casing at the rear was dropped still farther to form a large combustion chamber. This construction of the Muskegon Casing gave room for the proper mixture and combustion of the furnace gases and made it economical for settings in any locality and for any kind of fuel. It made the steel casing applicable to all plants.

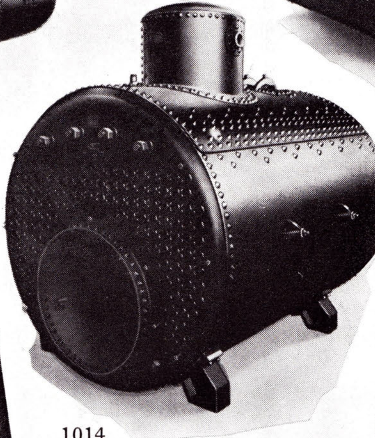
Later improvements have dropped the throat and combustion chamber to the boiler room floor. The Muskegon Steel Casing is now recognized as standard practice in return tubular boiler settings.



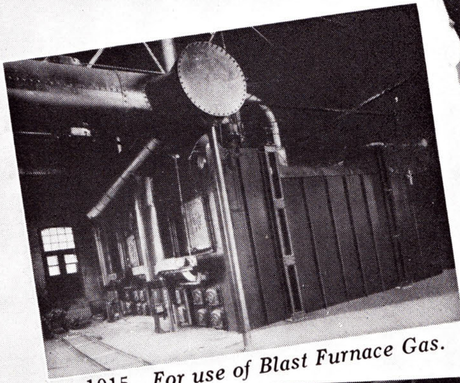
1012
Locomotive Boiler.



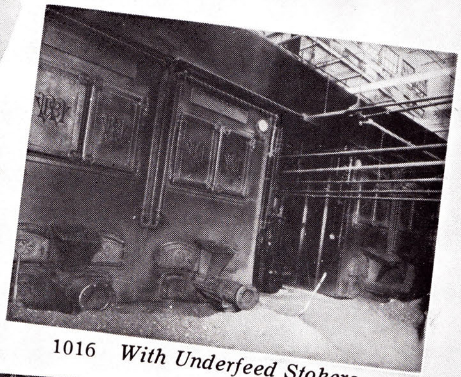
1013
Horizontal Return Tubular Boiler.



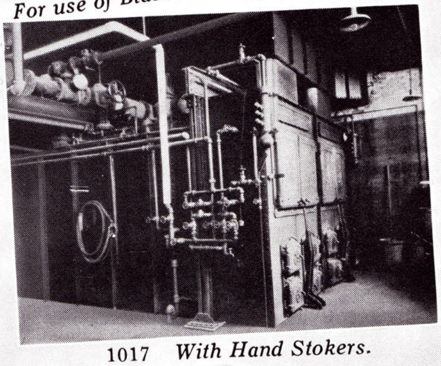
1014
Internal Fired Boiler.



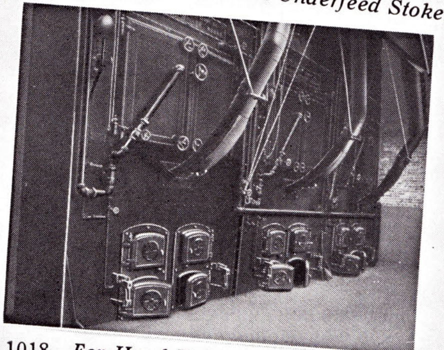
1015 *For use of Blast Furnace Gas.*



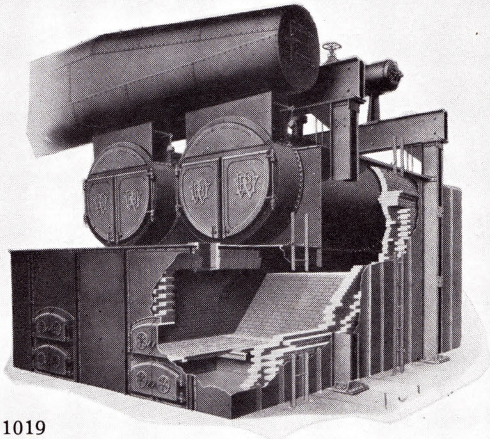
1016 *With Underfeed Stokers.*



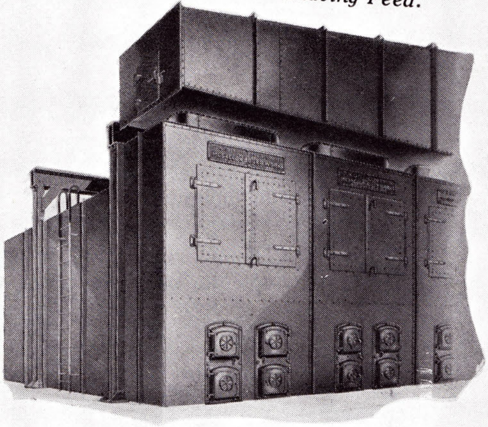
1017 *With Hand Stokers.*



1018 *For Hand Firing and Shaving Feed.*

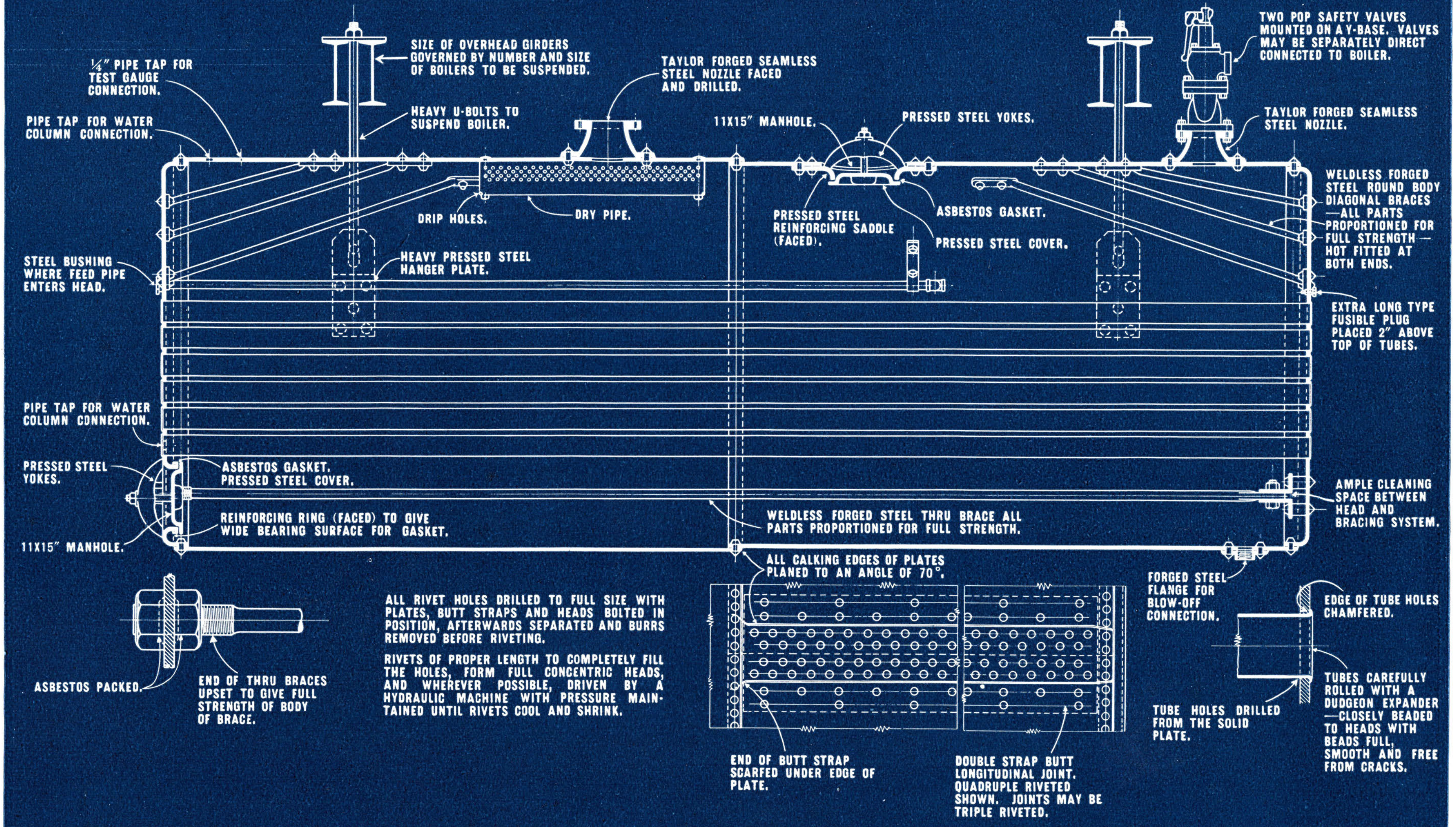


1019
Typical Dutch Oven Setting.



1020 *Typical Full Flush Setting.*

The Muskegon Steel Casing has rapidly become the standard type for H. R. T. boiler settings.

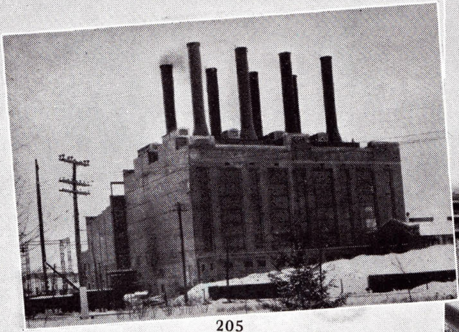


1/4" PIPE TAP FOR TEST GAUGE CONNECTION.
SIZE OF OVERHEAD GIRDERS GOVERNED BY NUMBER AND SIZE OF BOILERS TO BE SUSPENDED.
TAYLOR FORGED SEAMLESS STEEL NOZZLE FACED AND DRILLED.
TWO POP SAFETY VALVES MOUNTED ON A Y-BASE. VALVES MAY BE SEPARATELY DIRECT CONNECTED TO BOILER.
PIPE TAP FOR WATER COLUMN CONNECTION.
HEAVY U-BOLTS TO SUSPEND BOILER.
11X15" MANHOLE.
PRESSED STEEL YOKES.
TAYLOR FORGED SEAMLESS STEEL NOZZLE.
WELDLESS FORGED STEEL ROUND BODY DIAGONAL BRACES—ALL PARTS PROPORTIONED FOR FULL STRENGTH—HOT FITTED AT BOTH ENDS.
DRIP HOLES.
DRY PIPE.
PRESSED STEEL REINFORCING SADDLE (FACED).
ASBESTOS GASKET.
PRESSED STEEL COVER.
STEEL BUSHING WHERE FEED PIPE ENTERS HEAD.
HEAVY PRESSED STEEL HANGER PLATE.
EXTRA LONG TYPE FUSIBLE PLUG PLACED 2" ABOVE TOP OF TUBES.
PIPE TAP FOR WATER COLUMN CONNECTION.
PRESSED STEEL YOKES.
ASBESTOS GASKET. PRESSED STEEL COVER.
AMPLE CLEANING SPACE BETWEEN HEAD AND BRACING SYSTEM.
REINFORCING RING (FACED) TO GIVE WIDE BEARING SURFACE FOR GASKET.
WELDLESS FORGED STEEL THRU BRACE ALL PARTS PROPORTIONED FOR FULL STRENGTH.
11X15" MANHOLE.
ALL CALKING EDGES OF PLATES PLANED TO AN ANGLE OF 70°.
FORGED STEEL FLANGE FOR BLOW-OFF CONNECTION.
EDGE OF TUBE HOLES CHAMFERED.
ASBESTOS PACKED.
END OF THRU BRACES UPSET TO GIVE FULL STRENGTH OF BODY OF BRACE.
TUBE HOLES DRILLED FROM THE SOLID PLATE.
TUBES CAREFULLY ROLLED WITH A DUDGEON EXPANDER—CLOSELY BEADED TO HEADS WITH BEADS FULL, SMOOTH AND FREE FROM CRACKS.
END OF BUTT STRAP SCARFED UNDER EDGE OF PLATE.
DOUBLE STRAP BUTT LONGITUDINAL JOINT. QUADRUPLE RIVETED SHOWN. JOINTS MAY BE TRIPLE RIVETED.

ALL RIVET HOLES DRILLED TO FULL SIZE WITH PLATES, BUTT STRAPS AND HEADS BOLTED IN POSITION, AFTERWARDS SEPARATED AND BURRS REMOVED BEFORE RIVETING.

RIVETS OF PROPER LENGTH TO COMPLETELY FILL THE HOLES, FORM FULL CONCENTRIC HEADS, AND WHEREVER POSSIBLE, DRIVEN BY A HYDRAULIC MACHINE WITH PRESSURE MAINTAINED UNTIL RIVETS COOL AND SHRINK.

Quality of material and details of construction, workmanship and test, conform to or exceed the requirements of the A. S. M. E. Boiler Code.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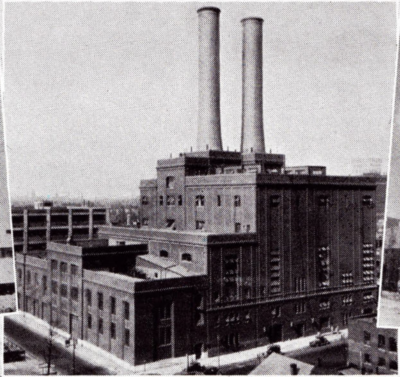
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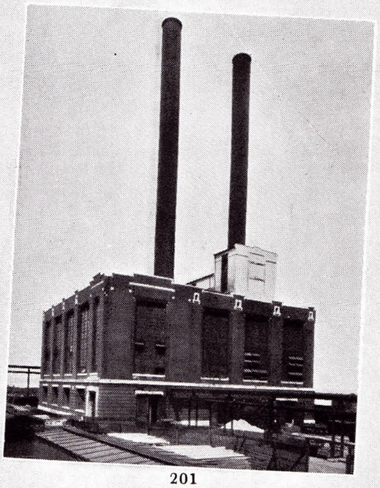
206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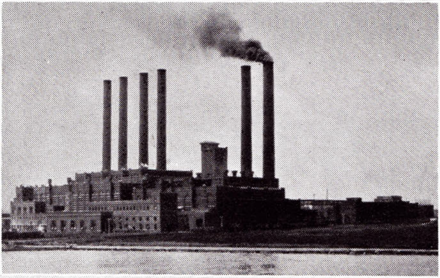
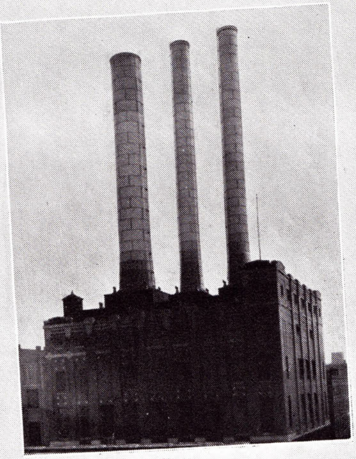
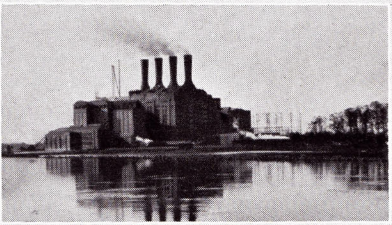
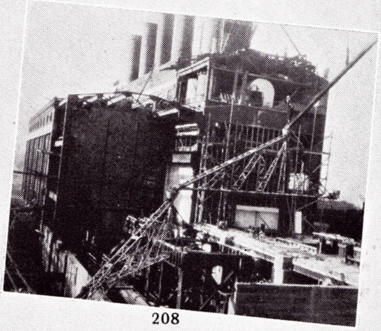

2014


2012


2010

207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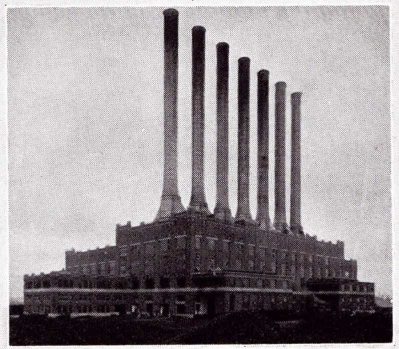
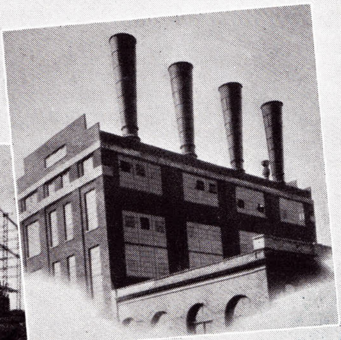

2013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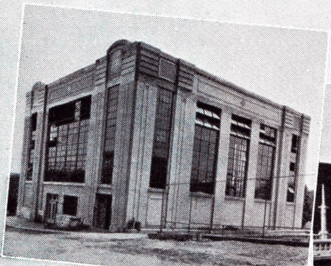
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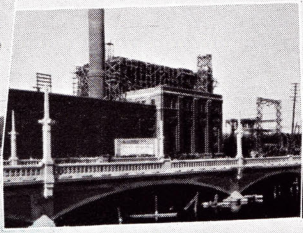
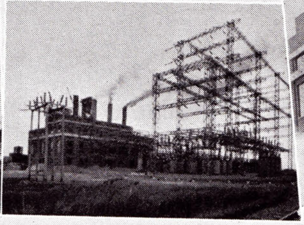
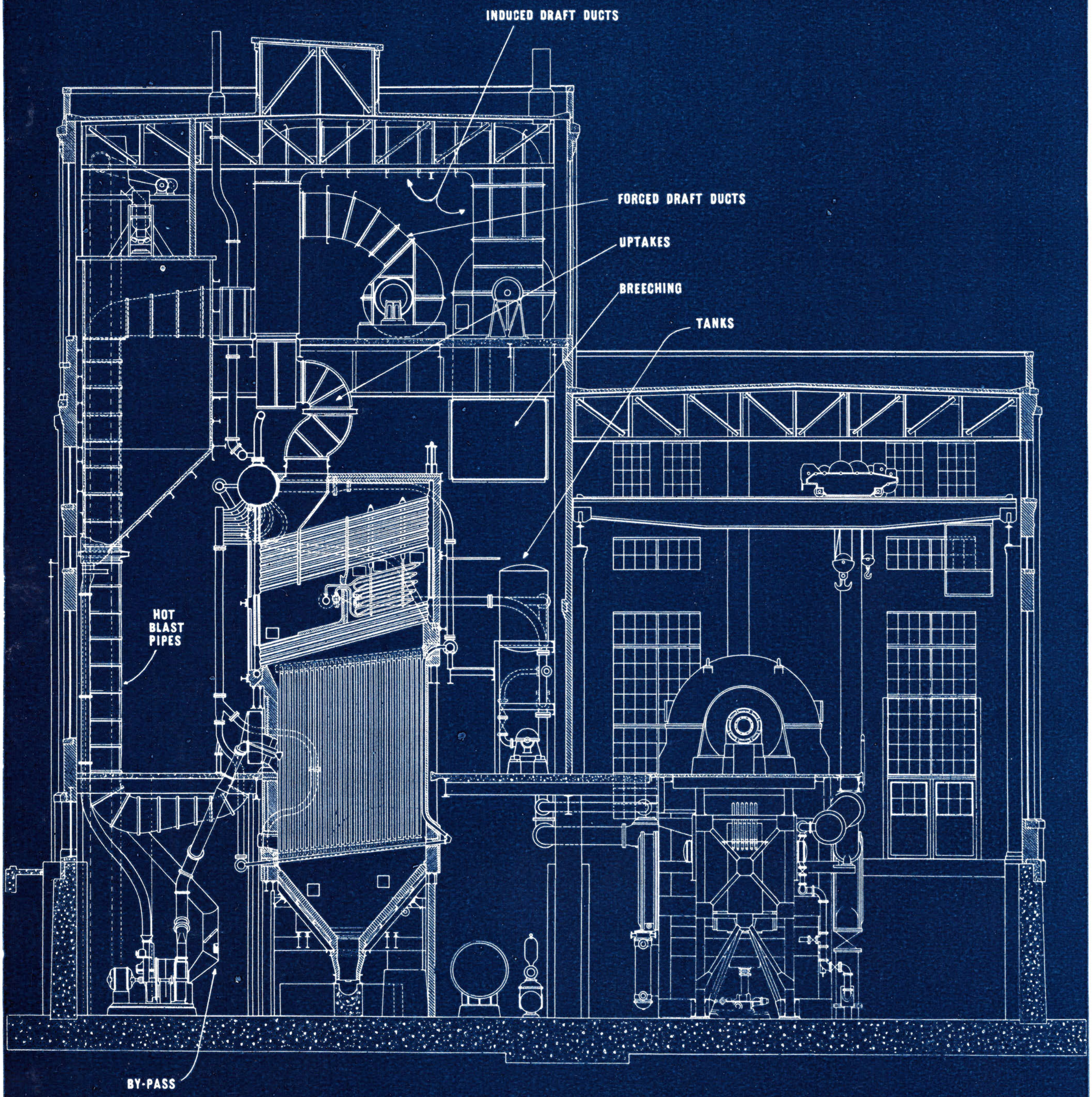

2011


204

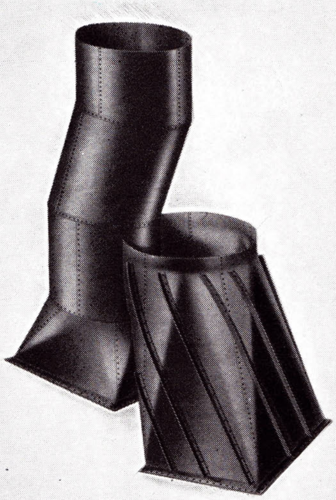
The modern power plant requires a great amount of fabricated plate work. The views above show power plants for which a large portion of such requirements have been furnished.

DESIGNERS

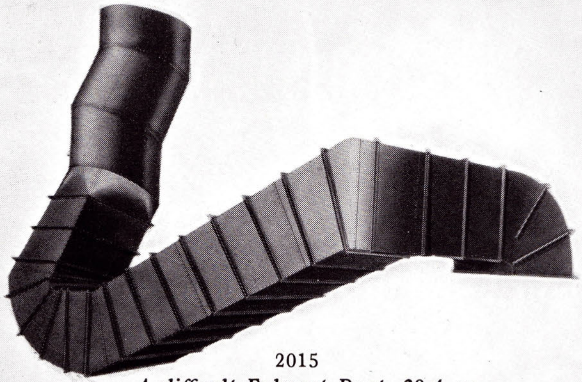
BUILDERS


INDUCED DRAFT DUCTS
FORCED DRAFT DUCTS
UPTAKES
BREECHING
TANKS
HOT BLAST PIPES
BY-PASS

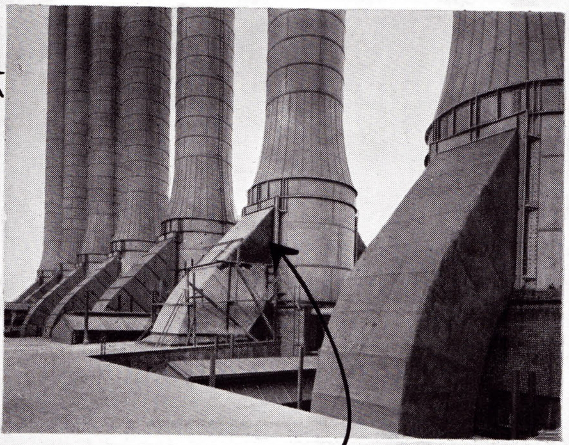
Fabricated plate products of the Muskegon Boiler Works are a part of the equipment of this plant.



2019
A complicated breeching connection.

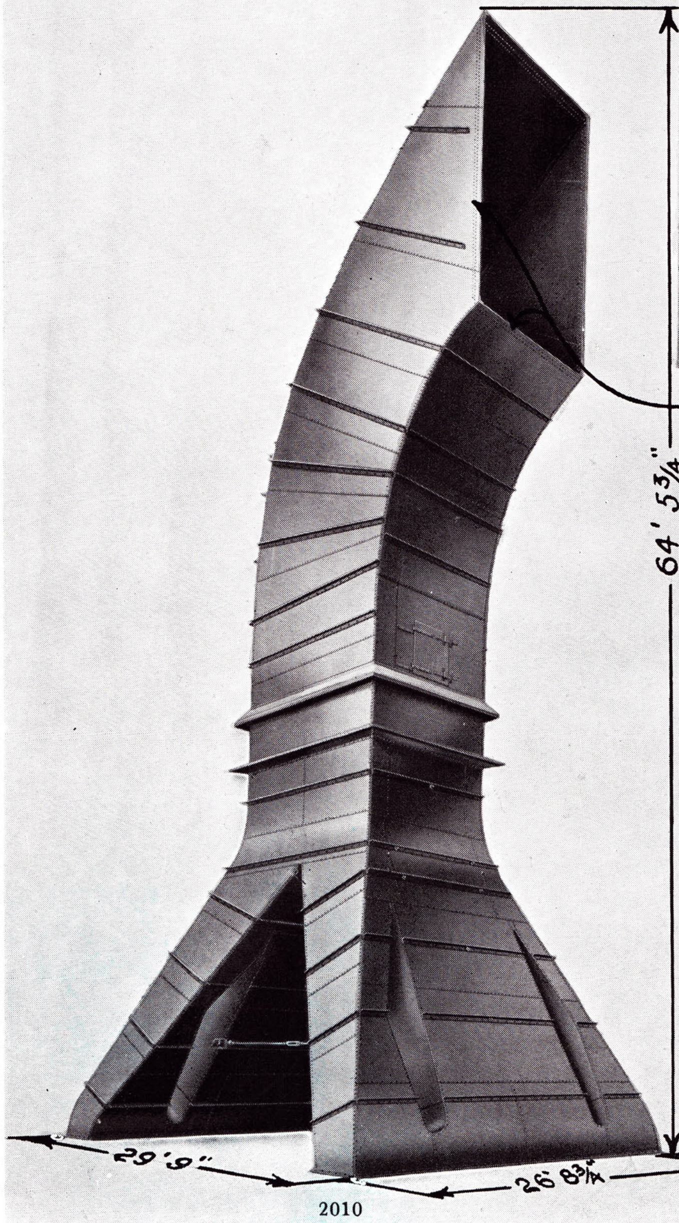


2015
A difficult Exhaust Duct. 28.4 sq. ft. area, 42′ 6″ run, 21′ 9″ rise.



2033

This connection came fair and true at the stack.

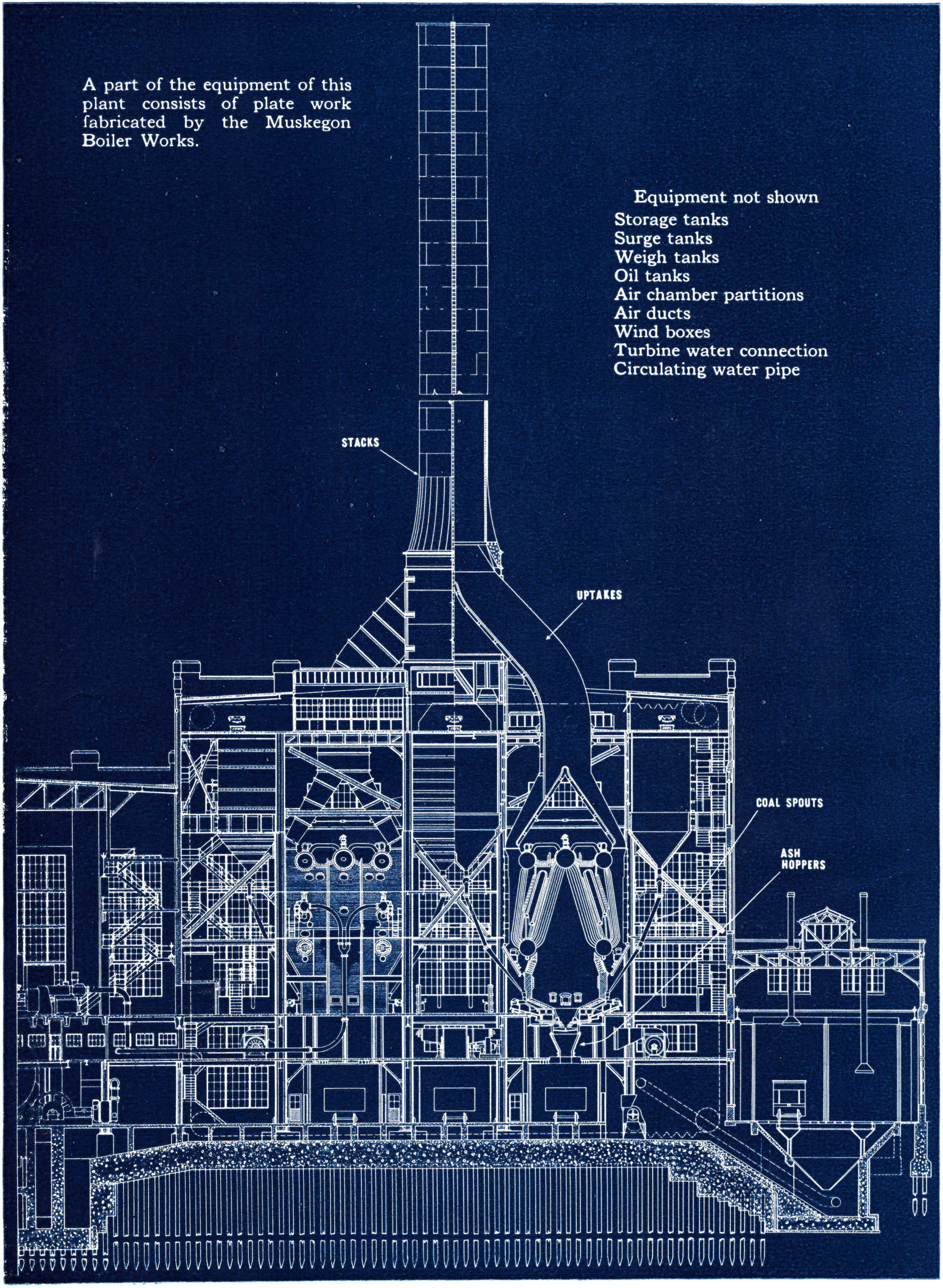


2010

UPTAKES, breechings, air and ventilating ducts are an essential part of power plants.

Here is illustrated one of fourteen 2400 H. P. uptakes. The work was shipped knockdown, and when erected, fitted in place true to dimensions. This construction, with its large irregular surfaces, the compound bending of the corner angles and the accuracy of the work, offers a good example of the Muskegon Boiler Works' ability in steel plate fabrication.

Examples are also shown of other irregular plate work.



STACKS
UPTAKES
COAL SPOUTS
ASH HOPPERS

A part of the equipment of this plant consists of plate work fabricated by the Muskegon Boiler Works.

Equipment not shown

- Storage tanks
- Surge tanks
- Weigh tanks
- Oil tanks
- Air chamber partitions
- Air ducts
- Wind boxes
- Turbine water connection
- Circulating water pipe

STACKS are a very important feature in the design and construction of the modern power plant.

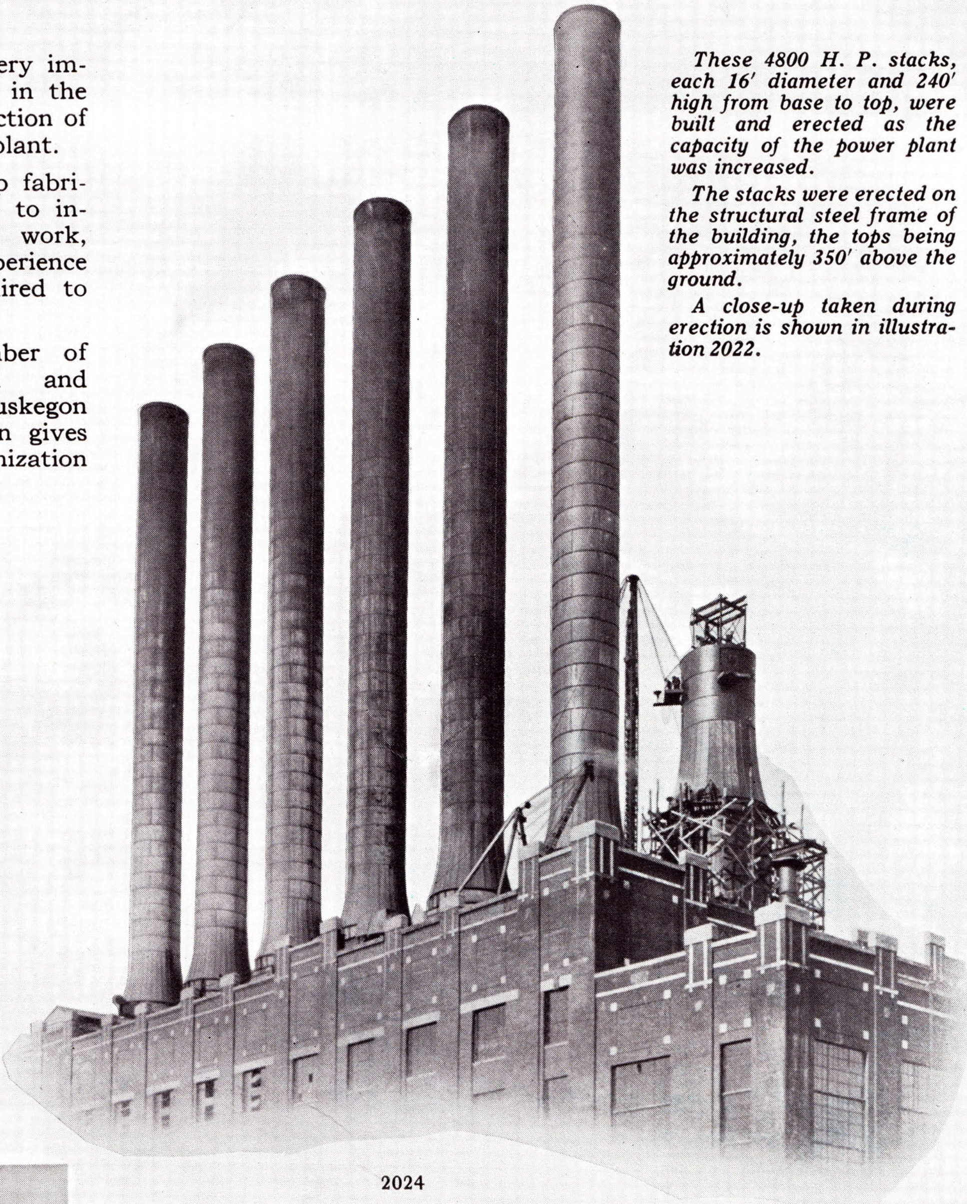
Accuracy in shop fabrication is necessary to insure true fitting work, while skill and experience in erection is required to keep them plumb.

The great number of stacks fabricated and erected by the Muskegon Boiler Works again gives evidence of its organization and equipment.

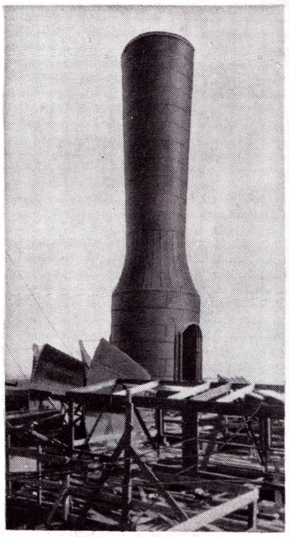
These 4800 H. P. stacks, each 16′ diameter and 240′ high from base to top, were built and erected as the capacity of the power plant was increased.

The stacks were erected on the structural steel frame of the building, the tops being approximately 350′ above the ground.

A close-up taken during erection is shown in illustration 2022.

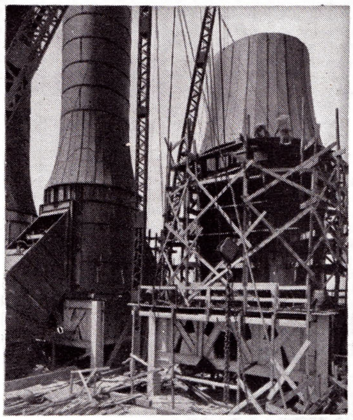


2024



2023

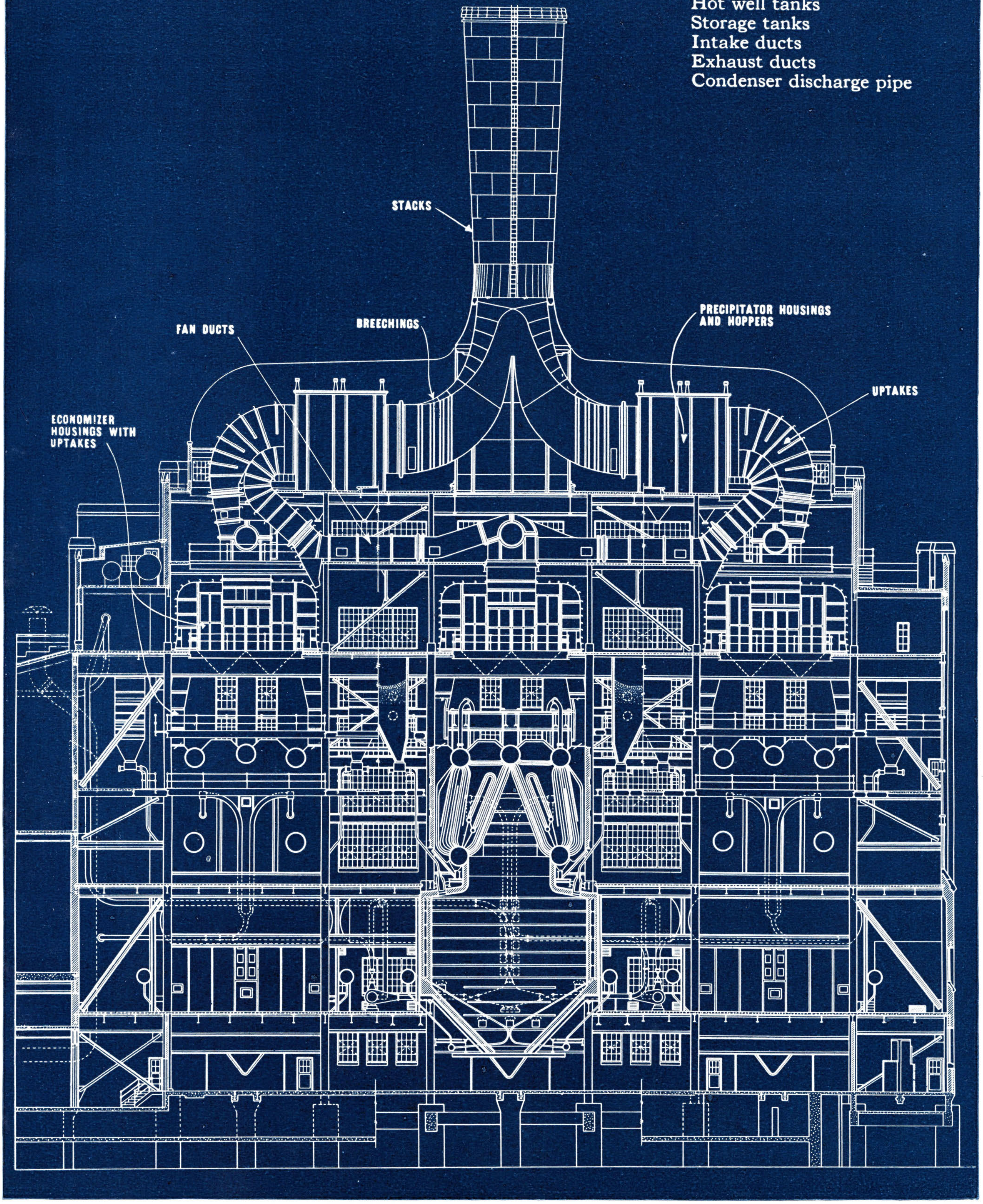
The evase stack has its place in power plant construction and has come into general use in recent years.

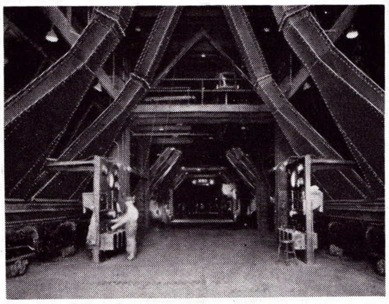


2022

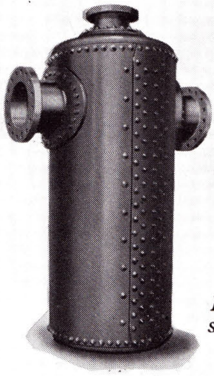
Fabricated plate work of the Muskegon Boiler Works enters into the equipment of this plant

Equipment not shown
- Hot well tanks
- Storage tanks
- Intake ducts
- Exhaust ducts
- Condenser discharge pipe


STACKS
BREECHINGS
FAN DUCTS
PRECIPITATOR HOUSINGS AND HOPPERS
UPTAKES
ECONOMIZER HOUSINGS WITH UPTAKES



2043 *An installation of coal spouts.*

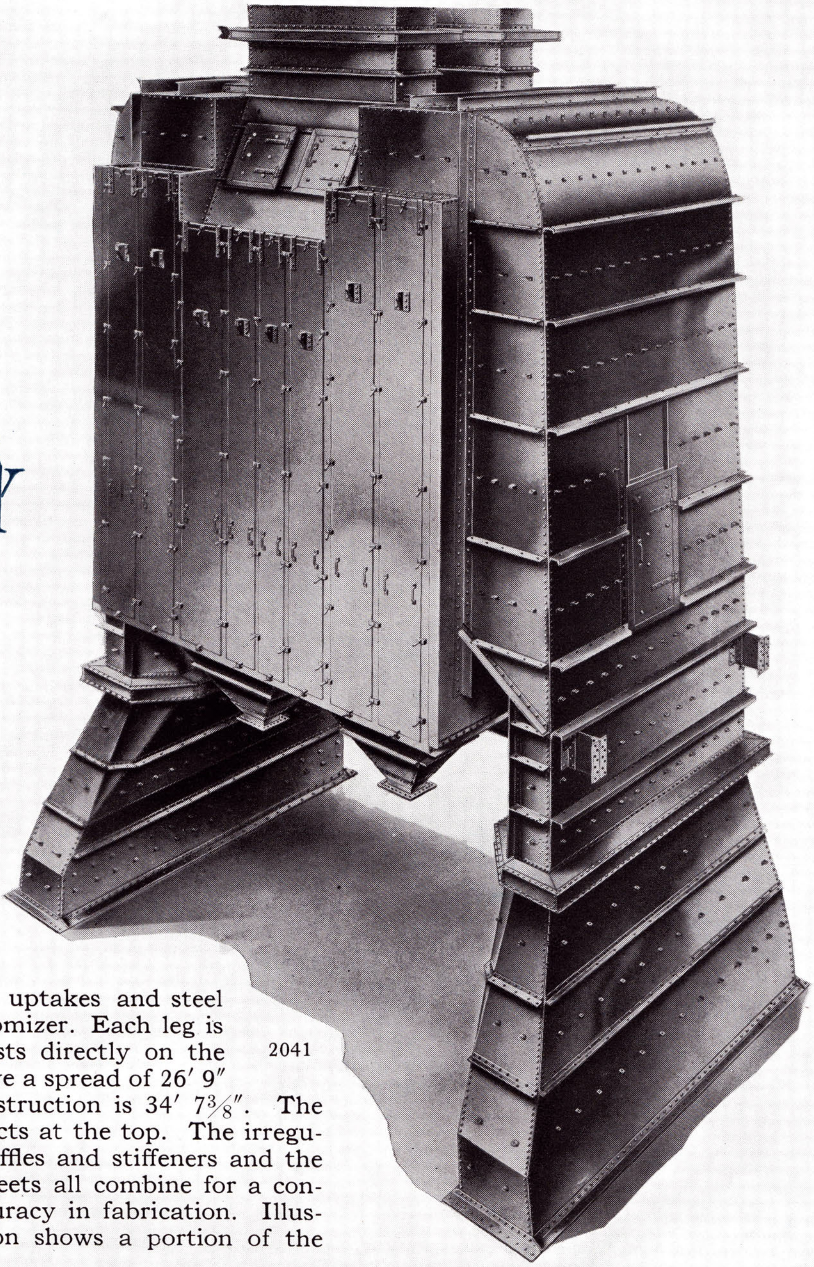


2037

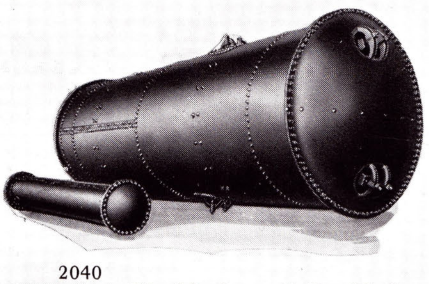
High pressure steam receiver.

THE demands of power plants for plate work are many and varied. The experience of the Muskegon Boiler Works extends over a large field of special constructions and fabricated plate equipment.

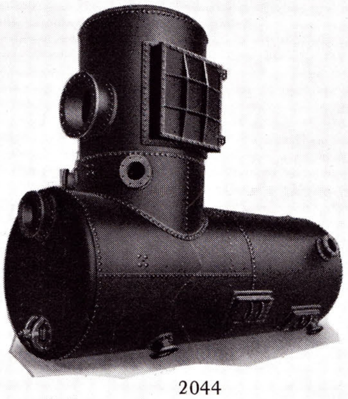
HERE are shown combination uptakes and steel casing for a 2600 H.P. Economizer. Each leg is 3′ 6″ wide, 24′ 4¾″ long and rests directly on the boiler damper plates. The legs have a spread of 26′ 9″ while the total height of the construction is 34′ 7⅜″. The uptake leading to the stack connects at the top. The irregularity in shape, the number of baffles and stiffeners and the thousands of holes in the tube sheets all combine for a construction demanding extreme accuracy in fabrication. Illustration 2038 taken during erection shows a portion of the interior of the Economizer.



2041

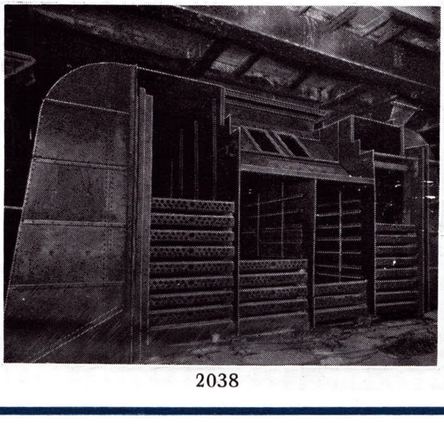


2040



2044

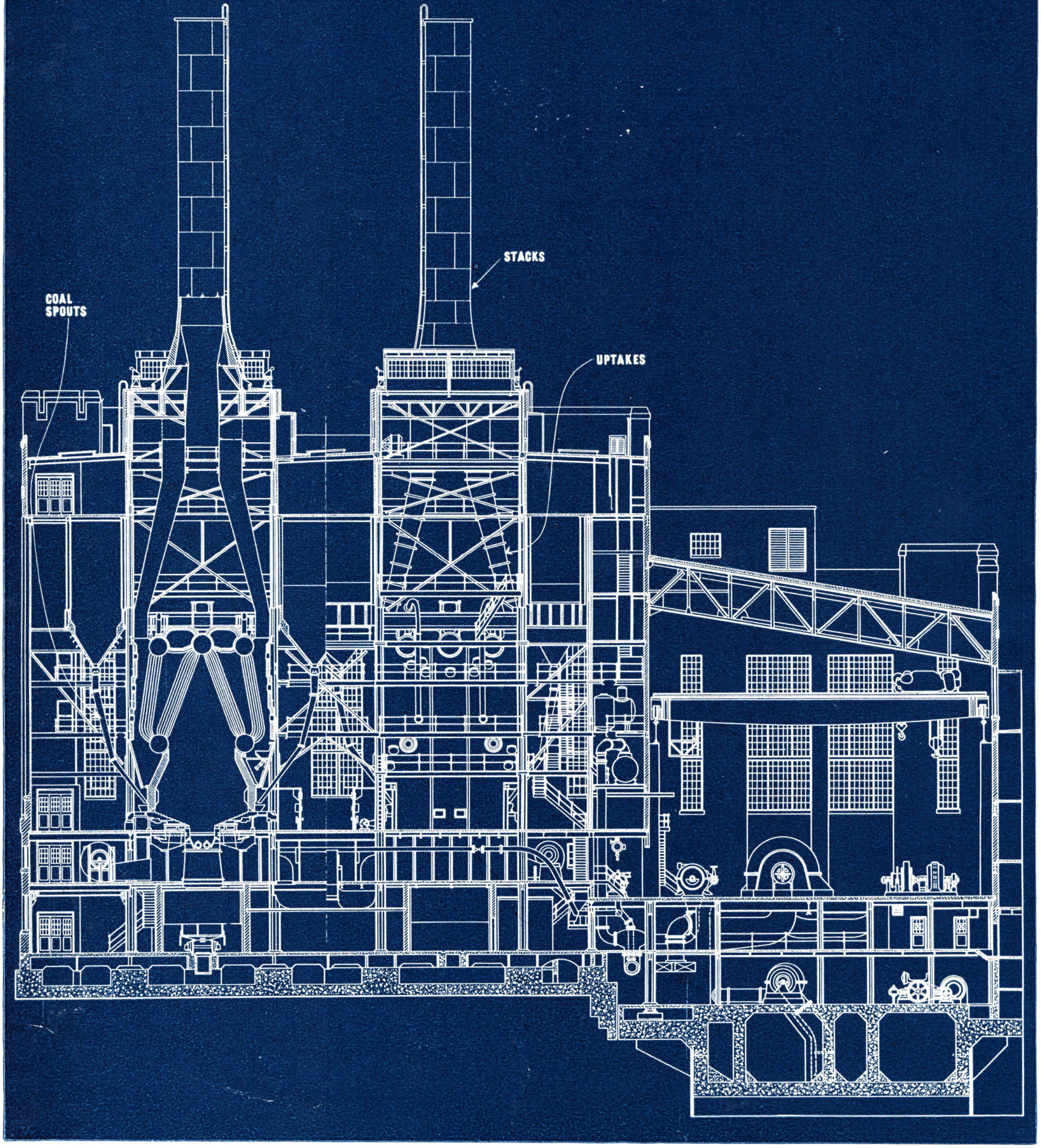
The Muskegon Boiler Works successfully met the requirements of these special heaters.



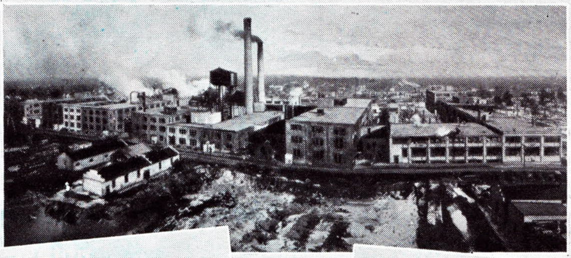
2038

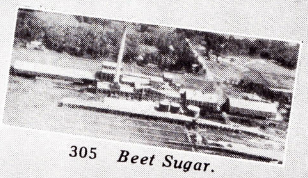
Many plate products of the Muskegon Boiler Works were employed in the equipment of this plant.

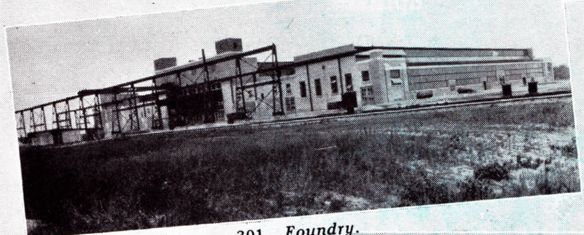
Equipment not shown
Oil tanks
Circulating water pipe
Condenser discharge water pipe
Economizer housings with
uptakes


COAL SPOUTS
STACKS
UPTAKES

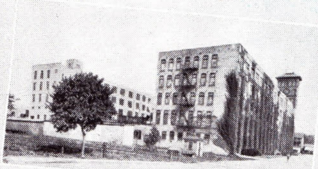
303 *Beet Sugar.*

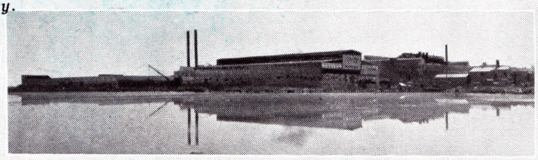

304 *Billiard Tables.*


305 *Beet Sugar.*


301 *Foundry.*

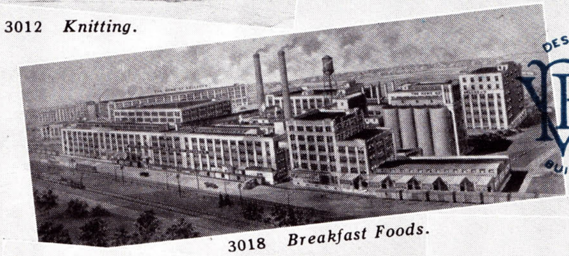
3019 *Breakfast Foods.*

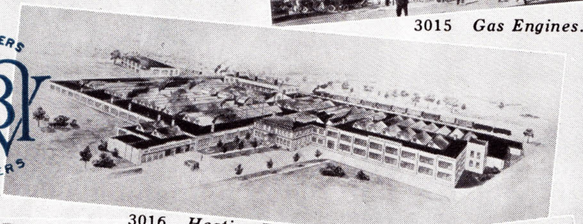

3012 *Knitting.*

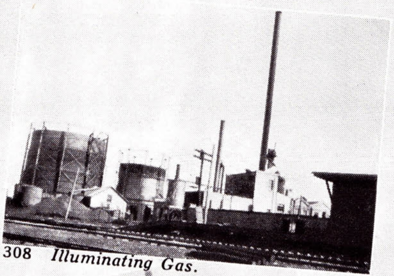

302 *Foundry.*

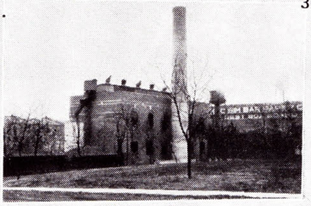
3015 *Gas Engines.*

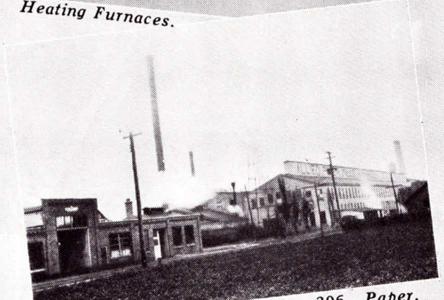
DESIGNERS
BUILDERS

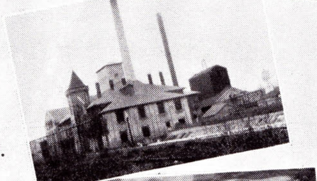

3018 *Breakfast Foods.*

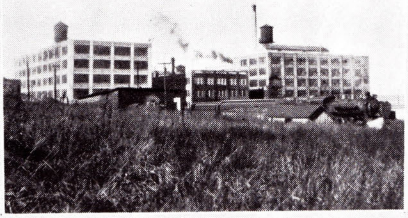

3016 *Heating Furnaces.*


308 *Illuminating Gas.*

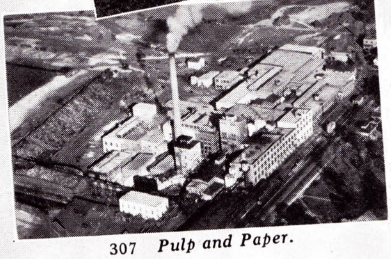

3011 *Paper.*

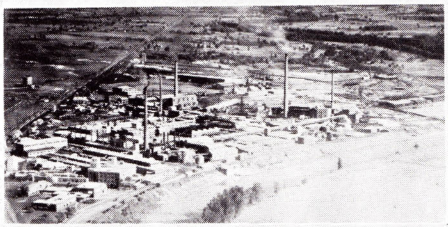

306 *Paper.*

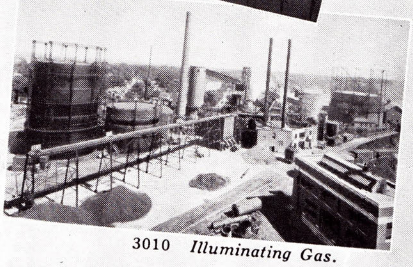

3017 *Paper.*


309 *Filing Cabinets.*

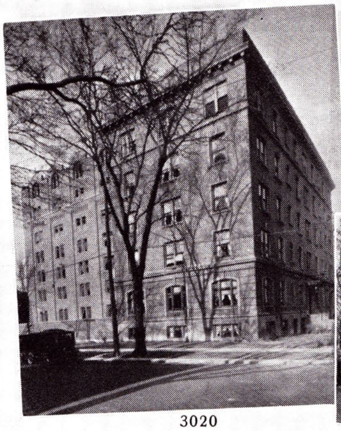
3014 *Salt.*


307 *Pulp and Paper.*


3013 *Chemicals.*


3010 *Illuminating Gas.*

Industries of every description require storage tanks, pressure vessels, hoppers, bins, and a great variety of fabricated plate and steel equipment.


3020

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Hospitals are exacting in their requirements and the Muskegon Boiler Works takes pride in the satisfactory service which its products render these institutions.

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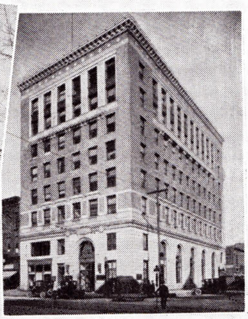
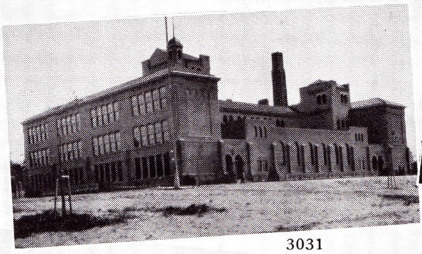

3024

Hotels, office buildings, clubs and similar buildings have their specialized needs—needs which are efficiently served by the organization and experience of the Muskegon Boiler Works.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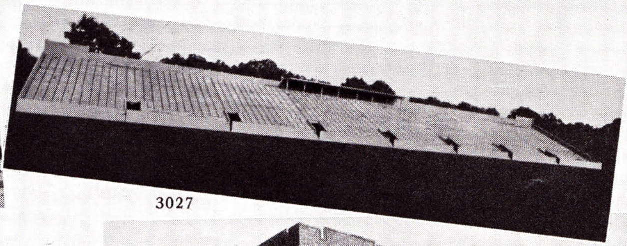
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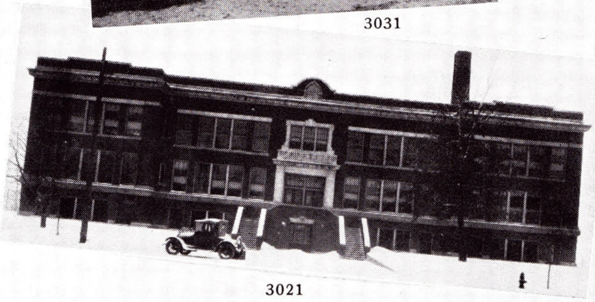
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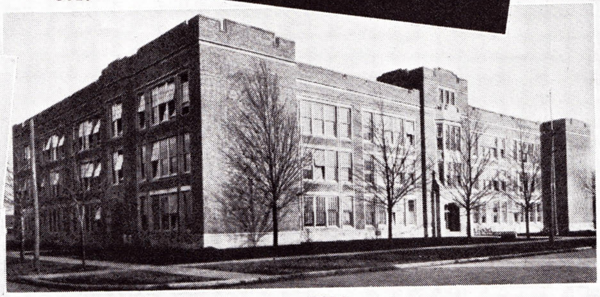
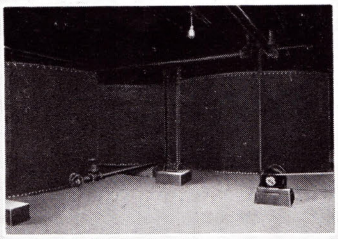
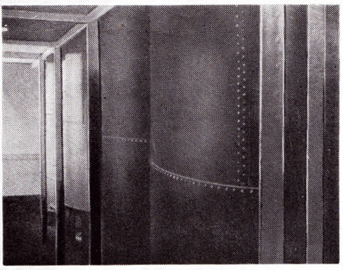

3030

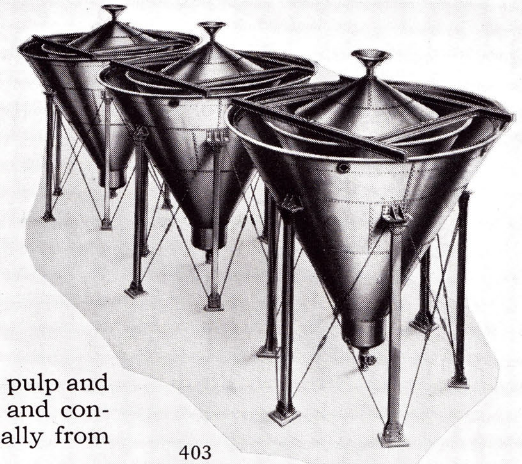
Grade, manual training, Junior and Senior High Schools and Junior Colleges with gymnasiums and athletic fields have become a part of our educational system, both public and private, and present their own power requirements.



405 *Liquor storage.*



402 *Digesters*



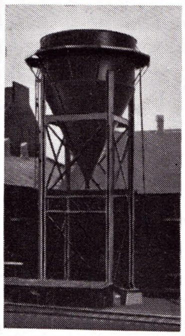
403

THE manufacture of the many varieties of pulp and paper is an important art of mechanical and chemical processes.

There are, in general, three classes of mills: pulp mills making various grades of pulp; converting mills, making paper only from pulp; and pulp and paper mills, making pulp and converting it into paper, usually from the slush form.

The prevention of waste and recovery of soda, pulp fibres, etc., is an important phase in this industry. The pulp and paper making, as well as the recovery process, require fabricated plate products of varying nature to meet the requirements and problems of the different mills. The Muskegon Boiler Works has furnished and installed a large amount of this work, and places its experience and organization at the disposal of the pulp and paper manufacturer.

Above and Left — Installations of save-alls for the recovery of pulp fibre.



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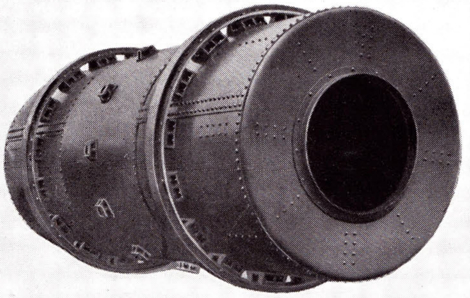
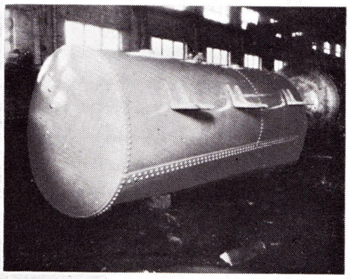


406

Rotary drum used in the soda recovery process.

Below— Still used in preparation of paraffine for wax papers.



407

DESIGNERS

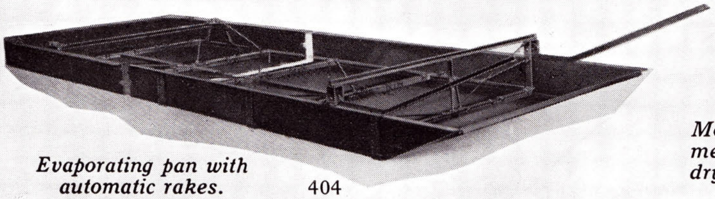
BUILDERS

FROM time immemorial salt has held a most significant place in, and has greatly influenced, the commerce, warfare and civilization of the peoples of the earth. Present methods render it readily available for its many uses in our modern life, and its production is one of our basic industries.

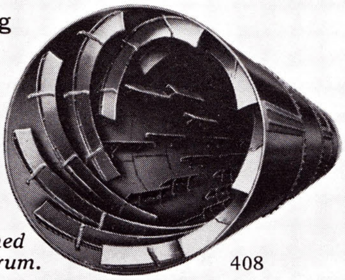
Salt is brought from the "wells" in the form of brine which is purified and evaporated. There are many methods for preparing the salt grains for the trade. One is by slow evaporation in shallow pans from 20′ to 25′ wide and 80′ to 100′ or more long. It is customary to remove the flaky grains as they settle to the bottom, by means of automatic rakes, the salt then being conveyed to suitable storage.

The finer grades are dried in long Monel metal lined revolving drums through which heat is passed.

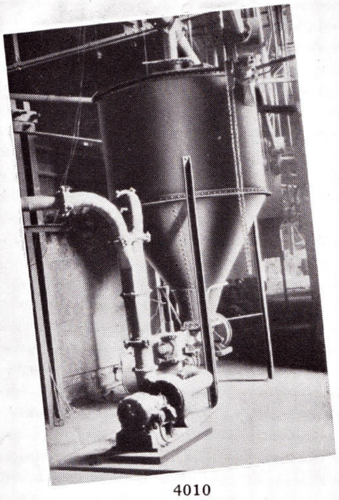
The experience of the Muskegon Boiler Works in furnishing equipment for this industry extends over many years.



Evaporating pan with automatic rakes. 404



Monel metal lined drying drum. 408



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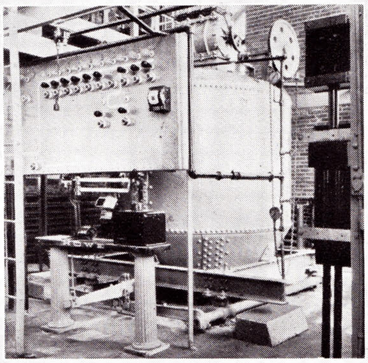

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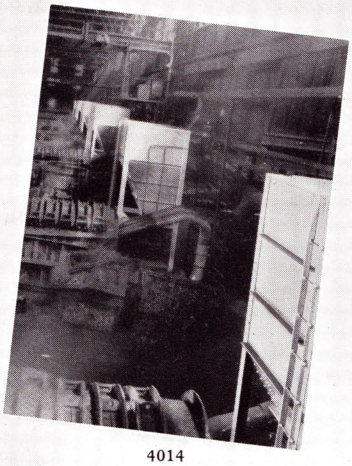
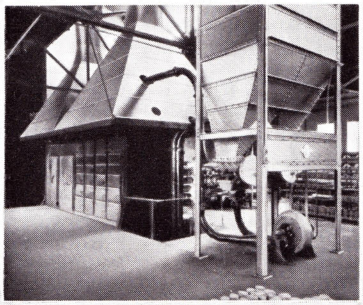


4014

POWDERED coal has recently been recognized as a desirable fuel. Constant developments and improvements in equipment and methods of preparing and supplying it to the furnace admit of its economical application to industries, including the large and small power plant.

The Muskegon Boiler Works has furnished the plate fabrication for many plants, the illustrations showing an installation in a large malleable iron foundry.



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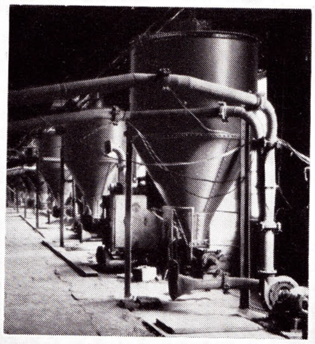


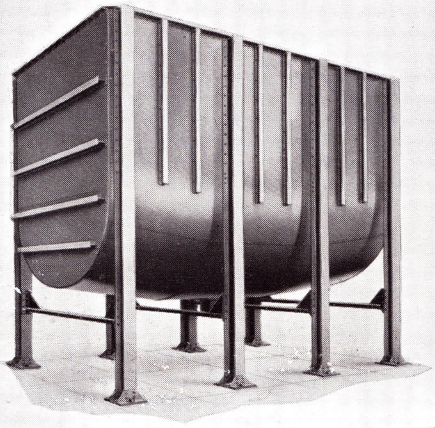
4015

IN the process of manufacture, from the unloading of the raw materials to the shipping of the finished product, practically every industry has use for bins and hoppers.

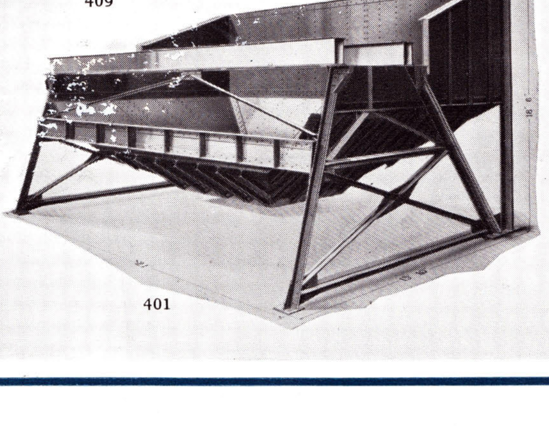
The power plant requires bunkers for coal storage, and the contractors and building materials companies, similar constructions for cement, sand, gravel, etc.

Cuts 401, 409, and 4016 illustrate some of these structures built by the Muskegon Boiler Works.

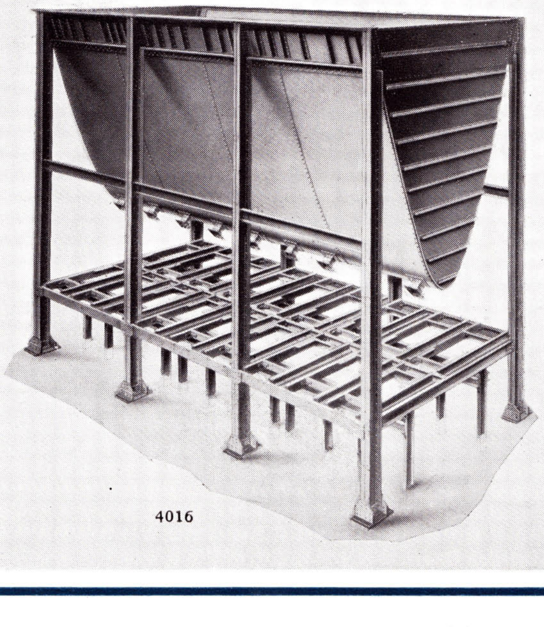
DESIGNERS MBW BUILDERS



409



401



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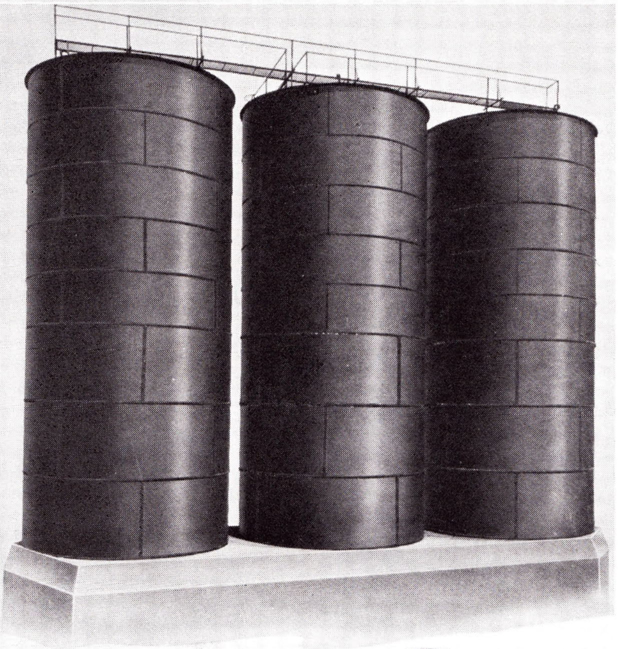

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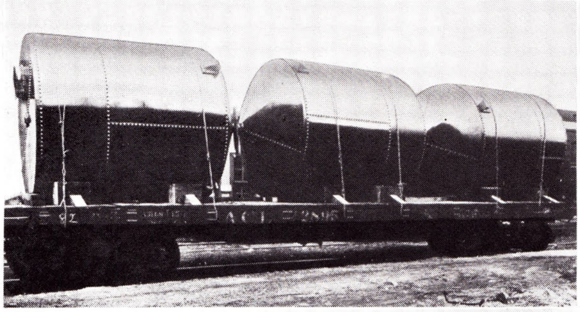
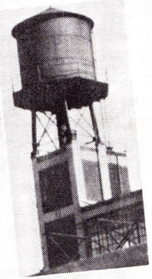


4018

4019

DESIGNERS
MBW
BUILDERS



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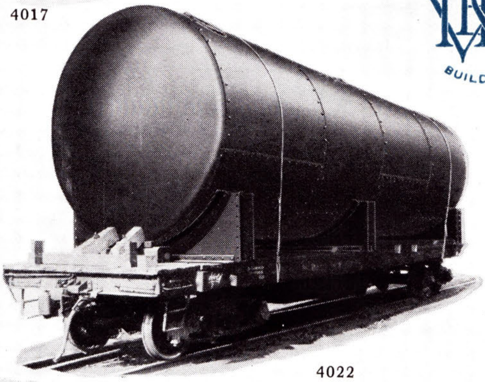

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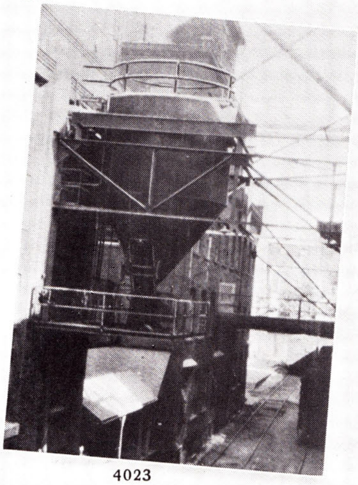

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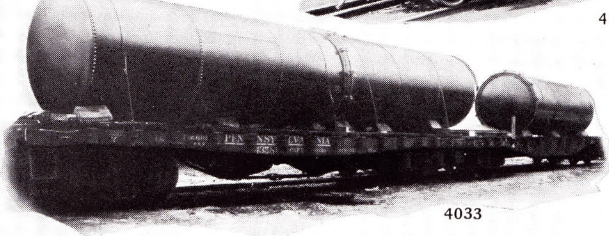

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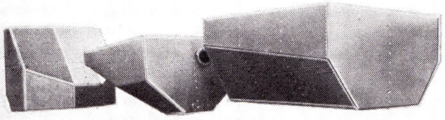

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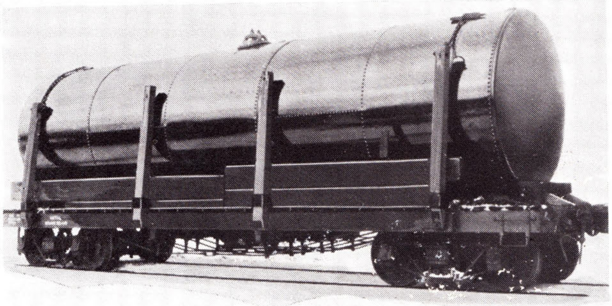
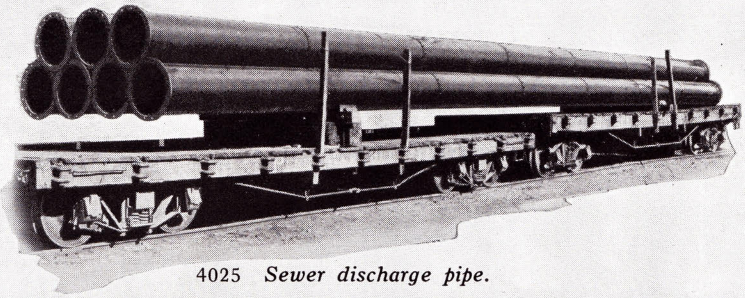


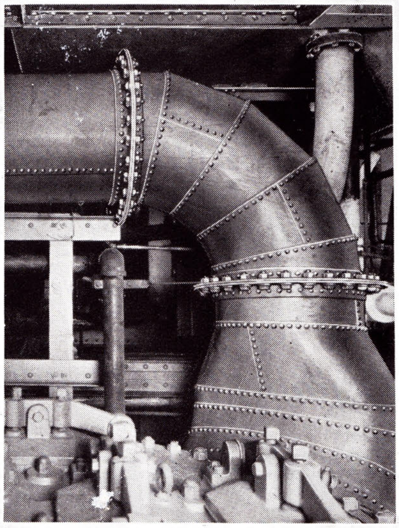
4024

OF all the plate equipment used by industry, that which comes within the general classification of tanks predominates. Air and pressure tanks and tanks of many different shapes and types of construction for the storage of a great variety of materials, constitute some of the requirements. Skill and precision are necessary in the fabrication so that all seams and joints will lay up perfectly, that pipe connections will be square and true and that brackets and towers will be assembled fair on the supporting structure. In the case of riveted work, tight joints should be secured by perfect fit of metal to metal, without depending on excessive caulking or welding. In welded work metal should be perfectly formed that true welded joints may be obtained without undue stress or distortion.

The illustrations on this page give one an idea of the diversified riveted and welded work the Muskegon Boiler Works has fabricated to meet the needs of the engineer, the manufacturer and the contractor.

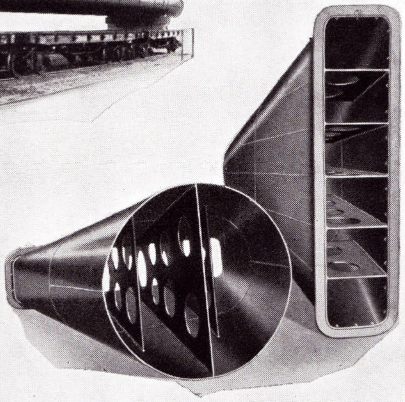


4025 *Sewer discharge pipe.*

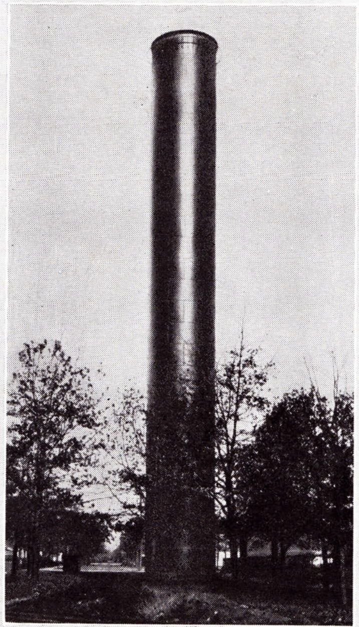


4026 *Water Pipe Connection.*

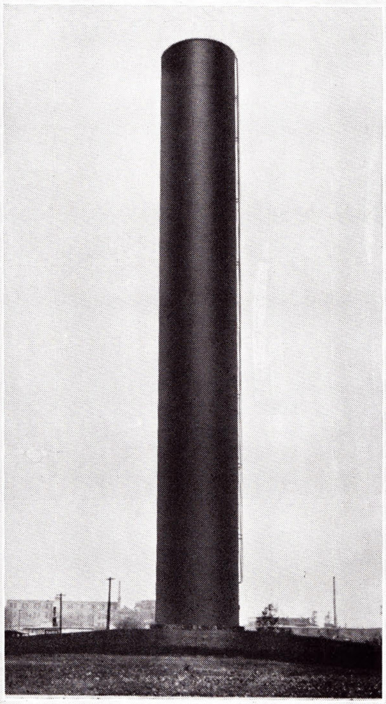
4027
100′ lengths of 48″ water intake pipe.



4028 *Condenser discharge pipe.*



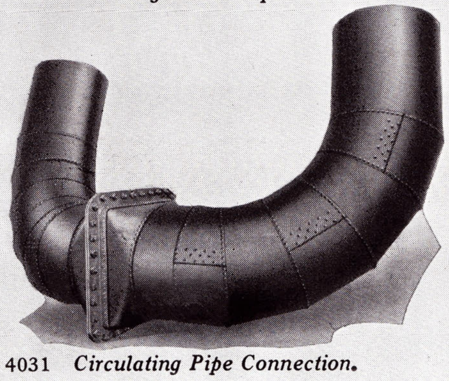
4029 *City Stand Pipe.*



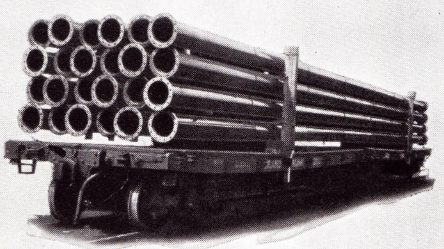
4030 *City Stand Pipe.*

RIVETED and welded pipe of different shapes has its place in our modern world of mechanical equipment. Here again accuracy is demanded that the work may be assembled true and that perfect joints may be obtained in the fit of the material.

Muskegon Boiler Works is well organized and equipped for this class of work and is continually furnishing it to meet the various requirements.



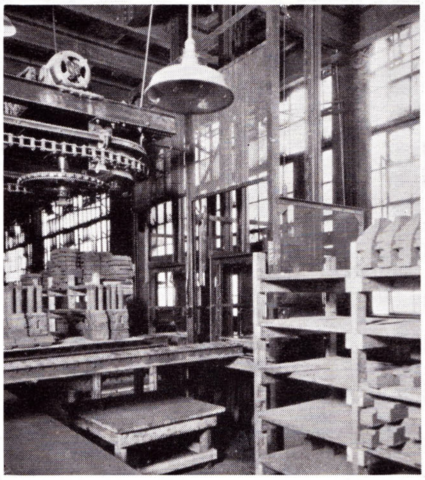
4031 *Circulating Pipe Connection.*



4032
Water intake pipe.

501 *Link chain factory.*

502 *Foundry interior.*



504 *Elevator installation in a foundry.*

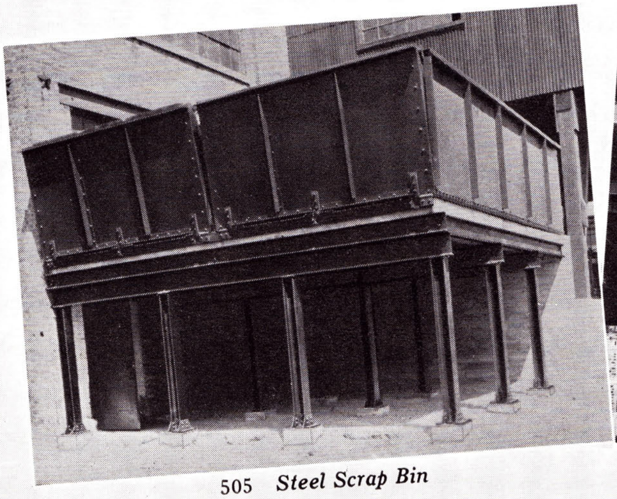
503 *Conveyor bridge.*

DESIGNERS
BUILDERS

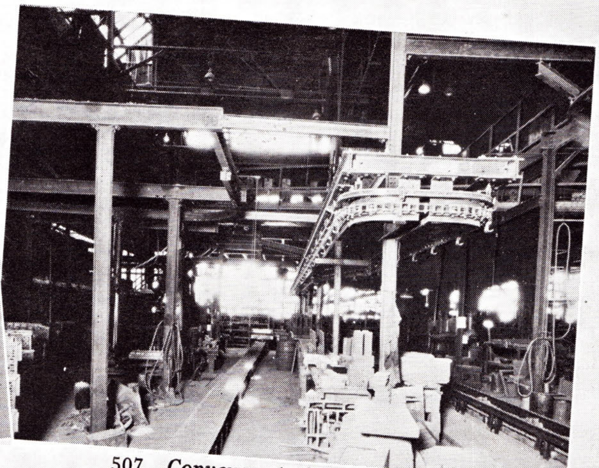
506 *Foundry Sand Balcony and Spouts*

STRUCTURAL steel plays a most important part in this age of metal construction. The Muskegon Boiler Works is not a structural shop, but is prepared to furnish the structural work which supplements and is a part of its products.

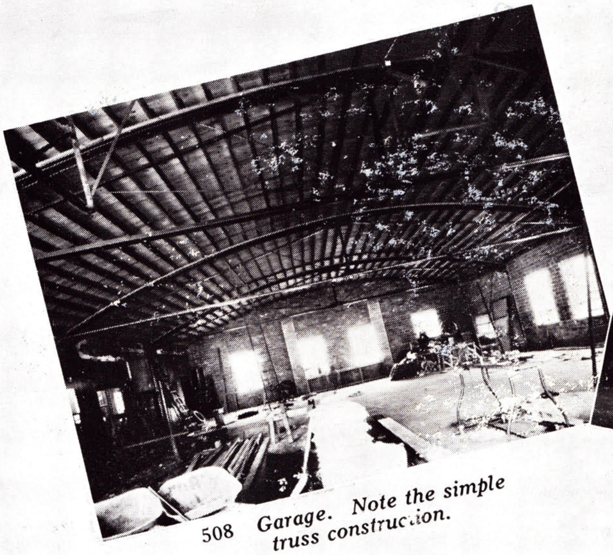
Relationship is maintained with structural fabricators, and the Company is prepared, through cooperation with them, to meet all steel requirements.



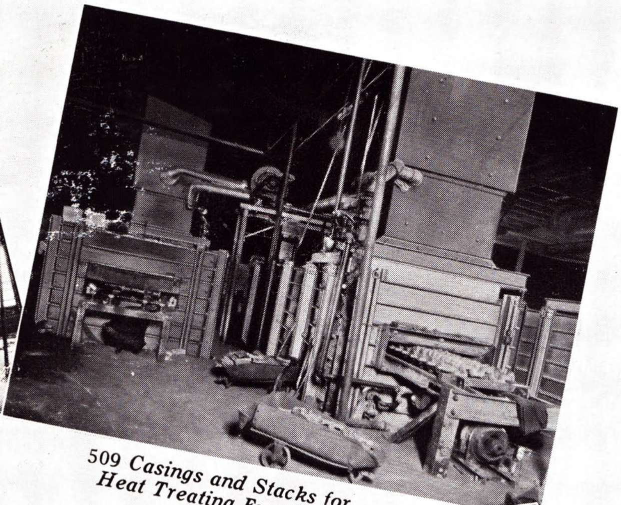
505 *Steel Scrap Bin*



507 *Conveyor steel for large foundry.*

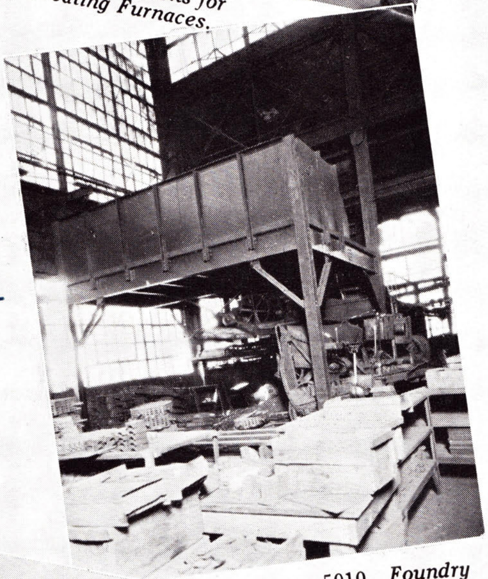


508 *Garage. Note the simple truss construction.*

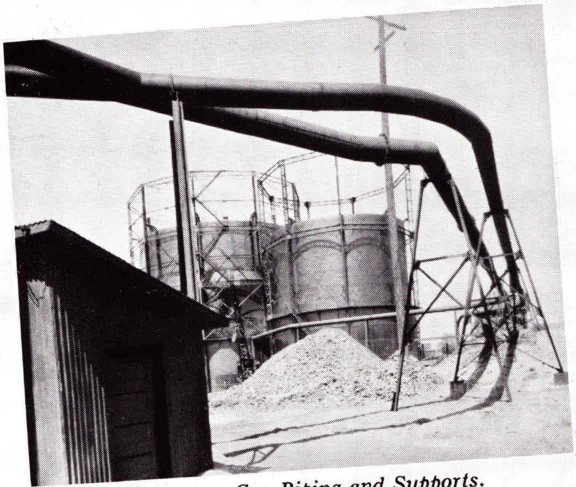


509 *Casings and Stacks for Heat Treating Furnaces.*

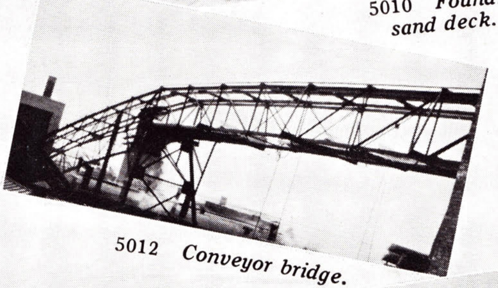
The ability of the Muskegon Boiler Works and its associates to design, fabricate and erect riveted and welded steel structures is illustrated in these pages, while the repeated assembly of work in the field without the use of drift pins to fair holes demonstrates the accuracy entering into its fabrication.



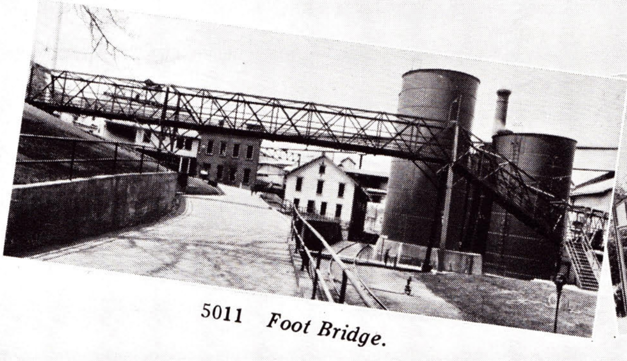
5010 *Foundry sand deck.*



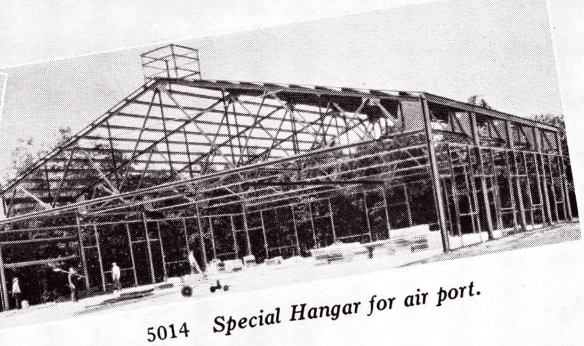
5013 *Gas Piping and Supports.*



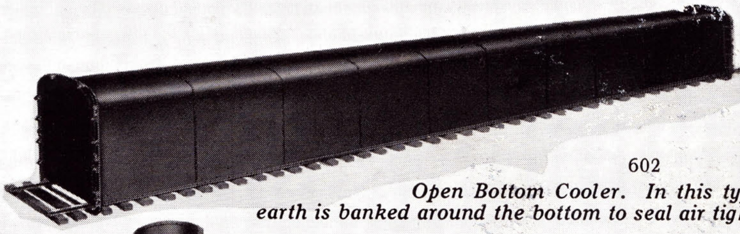
5012 *Conveyor bridge.*



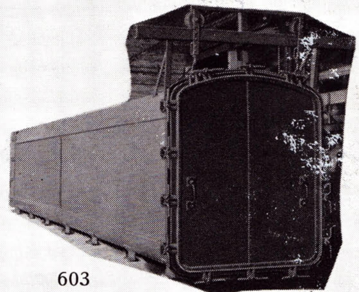
5011 *Foot Bridge.*



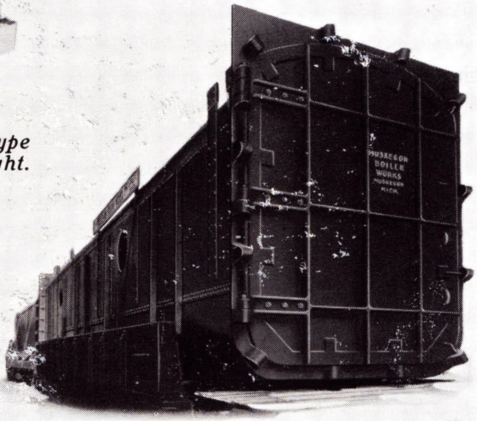
5014 *Special Hangar for air port.*



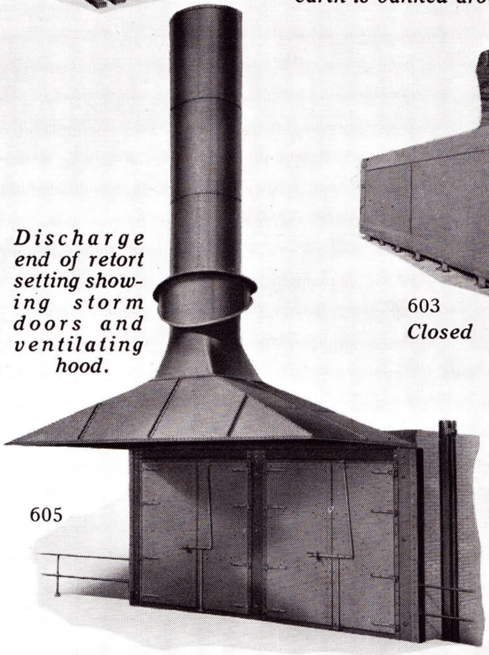
602
Open Bottom Cooler. In this type earth is banked around the bottom to seal air tight.



603
Closed bottom type of cooler.



604
Jumbo Retort. Made for larger cars than used with the usual 10 cord size.



605
Discharge end of retort setting showing storm doors and ventilating hood.

THE destructive distillation of wood holds a prominent place in the arts. The method most common is to distill the wood in steel retorts containing a standard gauge track. The wood is cut in 4′ lengths and placed in steel cars each holding about 2½ cords, four cars constituting a charge.

After distillation of the wood, now become charcoal, the cars are placed in a steel cooler, and again in a second cooler; at the same time the retort is receiving its successive charges every twenty-four hours.

The volatile matter coming from the wood is passed through condensers, yielding pyroligneous acid, from which is obtained a number of products, chief of which is wood alcohol and acetate of lime.

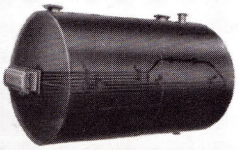
The crude wood alcohol is refined by being treated and passed through stills, while the acetate liquor is withdrawn from the stills, then evaporated to a thick paste in open steam pans and removed to the floor on top of the retorts where drying is completed.

In late years many chemical plants have been built to use wood formerly wasted. The Muskegon Boiler Works has built hundreds of carloads of equipment for this industry.

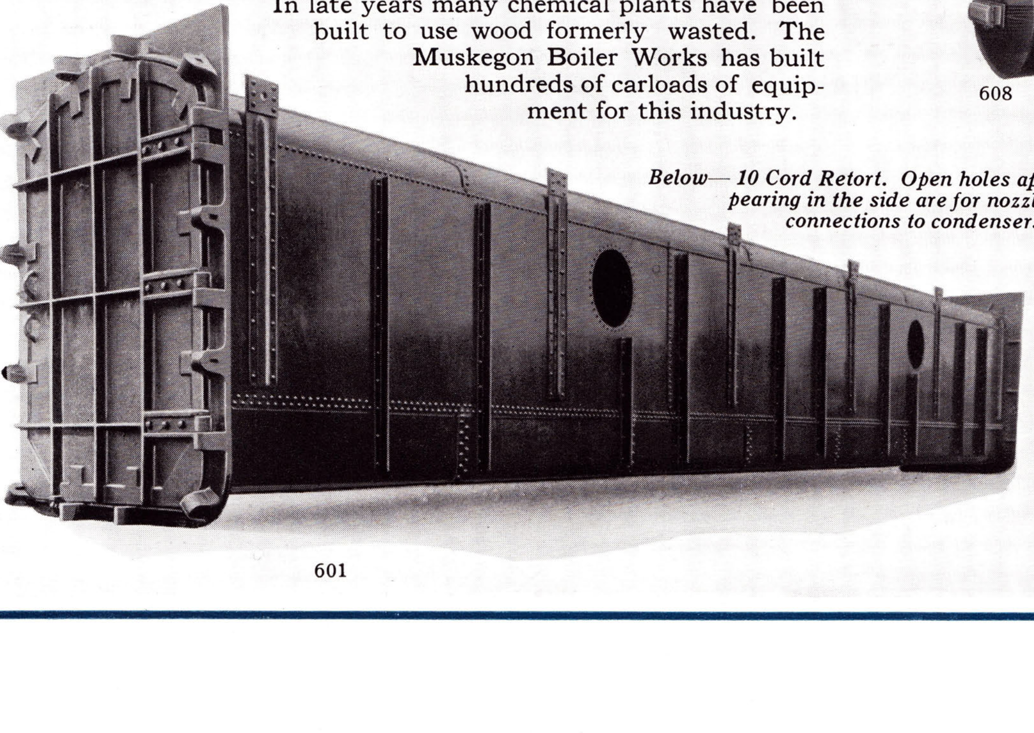
606 *Steam acetate evaporating pan.*

Three types of wood alcohol stills

607 *Vertical Still.*

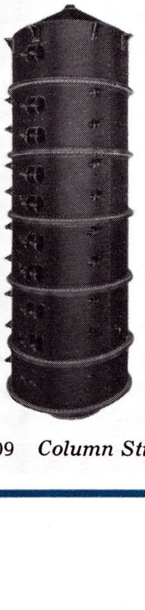


608 *Horizontal Still.*



Below— 10 Cord Retort. Open holes appearing in the side are for nozzle connections to condensers.

601



609 *Column Still*

THE blast furnace has no substitute and is unique in that the principal has remained unchanged during many centuries. Iron is the most abundant metal of this planet and the blast furnace is the key unlocking nature's stores for our use. While it is a simple and natural transition of the bloomary process, it is one of the most difficult of metallurgical apparatus to operate.

The first blast furnace was built about the thirteenth century and has developed from a more or less crude construction 20 to 30 feet high built in the side of a hill and known as a "hillside furnace", to the present structure of enormous capacity.

A great amount of iron, fabricated plate and steel work is required in the modern blast furnace plant. Skill and experience are required to make the many irregular plate parts. The Muskegon Boiler Works has built and erected, also repaired, razed and rebuilt many of these plants.

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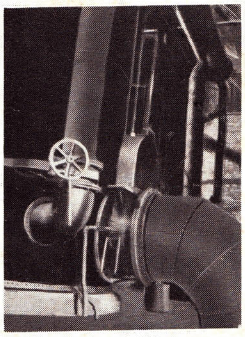
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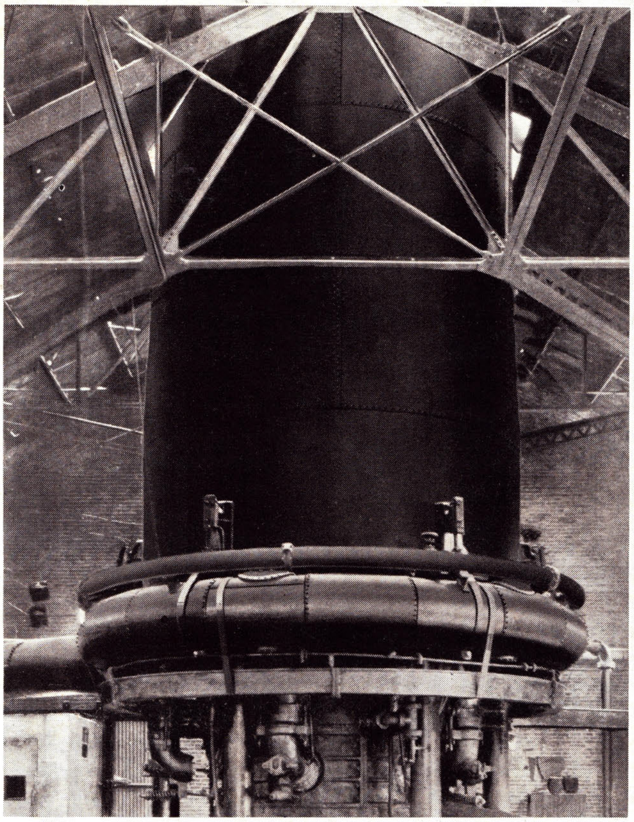
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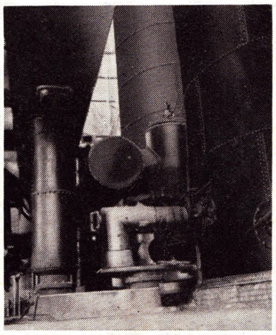
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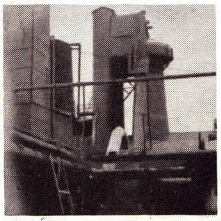
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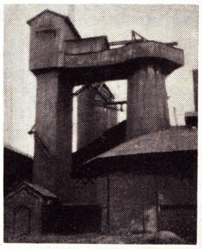
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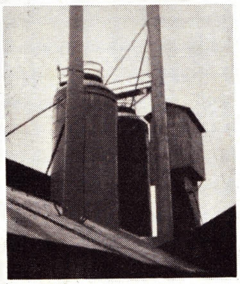
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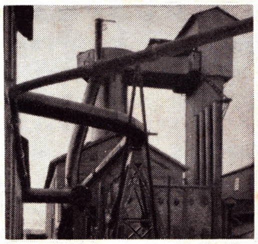
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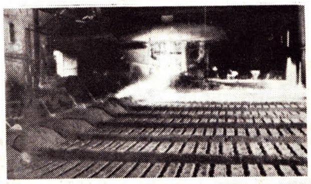
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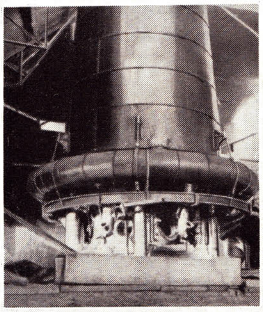
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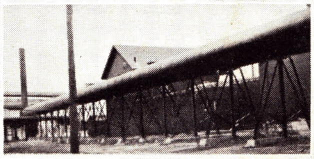
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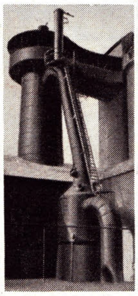
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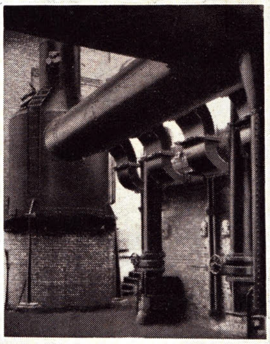
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